



Questions


on lesson one

Questions signed by  have been taken from the school book.

1. Choose the correct answer :

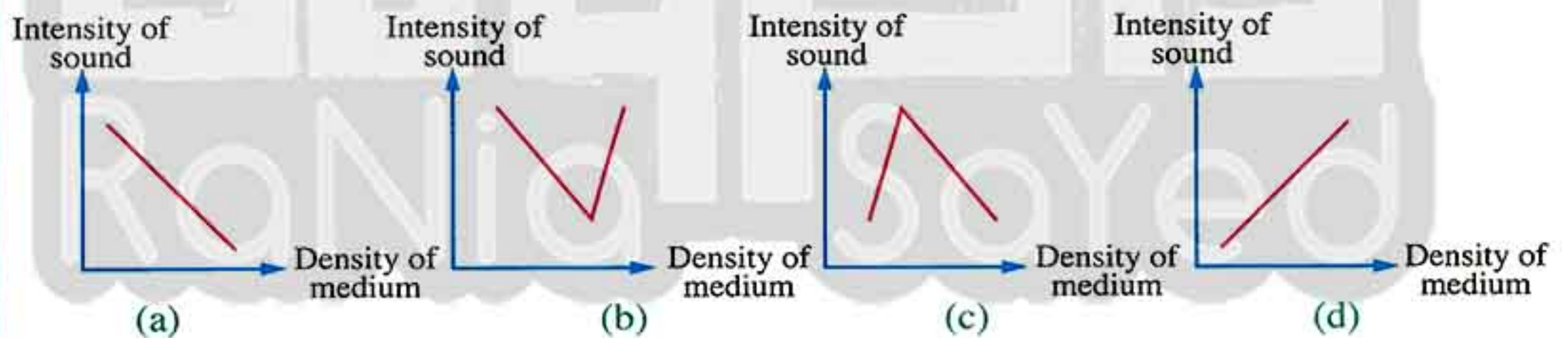
- Sound waves travel through
 - solids.
 - liquids.
 - gases.
 - (a) , (b) and (c).
- Sound waves do not travel through
 - water.
 - air.
 - vacuum.
 - wood.
- The sound produced from the school bell is considered as waves.
 - longitudinal
 - electromagnetic
 - transverse
 - longitudinal and transverse
- All of the following indicate the nature of sound waves except that
 - it's mechanical longitudinal waves.
 - it propagates as spheres of compressions and rarefactions.
 - its velocity through air is 430 m/s.
 - no correct answer.
- Before using modern technology in communication, people in desert were putting their ears on the ground to hear the sound of horses of their enemies at very far places because
 - sense of hearing is stronger than sense of vision.
 - the velocity of sound through solids (ground) is greater than that through air.
 - sound travels faster than light.
 - sound of horses' feet is very loud.
- The sound velocity is measured in unit.
 - Hertz
 - metre
 - decibel
 - metre/second
-  Sound wave that propagates through air with velocity 330 metre/sec. and of wavelength 0.1 metre, its frequency equals
 - 330 Kilo Hertz.
 - 3300 Hertz.
 - 33 Kilo Hertz.
 - 330 Hertz.
- All of these sounds are of uniform frequency except the sound of
 - violin.
 - guitar.
 - loudspeakers.
 - piano.
- The voice of Adham differs from that of Sara because they are different in
 - age.
 - intensity.
 - pitch.
 - kind.
- The human ears can often differentiate between the voice of the man and that of the woman, because
 - the voice of a woman is often high pitch and sharp.
 - the voice of a woman is often low pitch and sharp.
 - the voice of a woman is often high pitch and rough.
 - the voice of a man is often high pitch and sharp.

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11. The sound pitch increases by
- the decrease in frequency.
 - the increase in frequency.
 - the increase in amplitude.
 - the increase in the distance between the ear and the sound source.
12. We can prove that the pitch of sound depends on the frequency of vibration of the sound source by using with knowing the number of cycles (turns) and the number of gear teeth.
- the resonance box
 - a stretched string of fixed length
 - Savart's wheel
 - the tuning fork
13. The frequency of the vibrating string to its length.
- equals
 - is inversely proportional
 - is directly proportional
 - has no direct relation
14.  The sound of frequency 200 Hz is than the sound of frequency 100 Hz.
- stronger
 - sharper
 - weaker
 - harsher
15. A student rotates Savart's wheel with different velocities, the velocity which gives more rough sound is
- 20 rotation/sec.
 - 300 rotation/min.
 - 6 rotation/sec.
 - 10 rotation/sec.
16. The frequency of sound produced from a plate touching a gear of 20 teeth in Savart's wheel when the wheel rotates 300 cycle/minute equals Hz.
- 300
 - 15
 - 6000
 - 100
17. As the number of teeth of the gear in Savart's wheel increases, the of the produced sound increases.
- amplitude
 - intensity
 - frequency
 - quality
18. As the velocity of the rotation of the gear in Savart's wheel decreases, frequency decreases, consequently the of the sound decreases.
- pitch
 - type
 - amplitude
 - intensity
19. The frequency of the sound produced from Savart's wheel depends on
- the speed of rotation of the gear only.
 - the distance between the gear and you only.
 - the number of gear's teeth only.
 - (a) and (c) are correct.
20. The scientific term that expresses the strength and the weakness of sound is
- the frequency of sound.
 - the pitch of sound.
 - the quality of sound.
 - the intensity of sound.
21. The intensity of sound is directly proportional to
- the square of the distance from the source.
 - the square of the amplitude.
 - the distance from the source.
 - no correct answer.

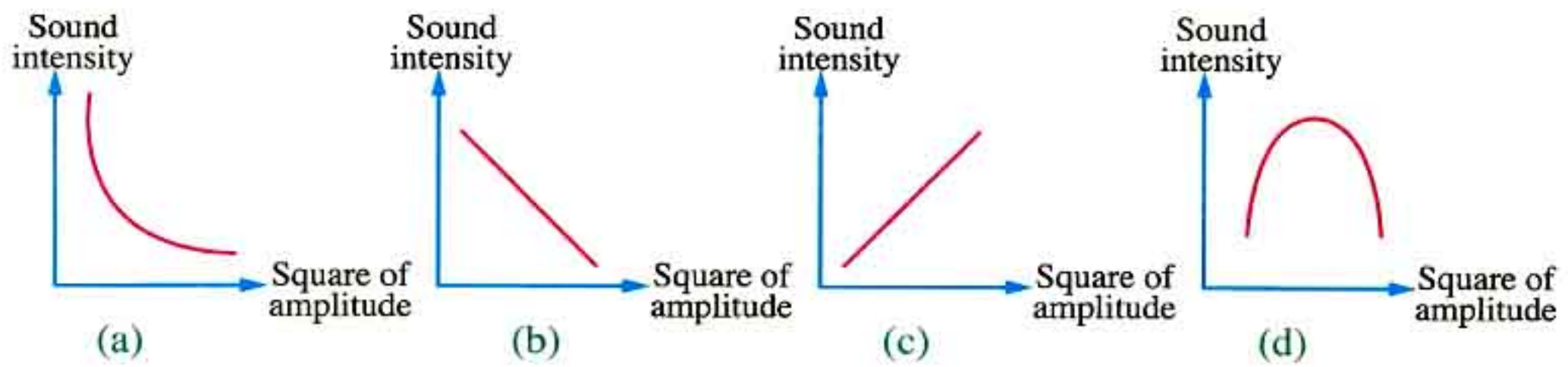
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22. The intensity of sound weakens as we go away from its source, because
- a. $I \propto \frac{1}{d}$ b. $I \propto d$ c. $I \propto \frac{1}{d^2}$ d. $I \propto d^2$
23. When the distance between the sound source and the ears is doubled, the sound intensity
- a. decreases to its half. b. increases twice.
c. increases four times. d. decreases to its quarter.
24. The measuring unit of sound intensity is
- a. m/sec. b. watt/m². c. decibel. d. Hertz.
25. All of the following are factors affecting sound intensity except the
- a. amplitude of vibration. b. medium density.
c. frequency. d. wind direction.
26. The resonance box increases the intensity of sound because it
- a. decreases the vibrating surface area.
b. increases the vibrating surface area.
c. increases the frequency of the produced sound.
d. decreases the pitch of the produced sound.
27. The figure represents the relation between the sound intensity and the density of the medium.



28. Sounds of different musical instruments can be differentiated from each other by
- a. frequency. b. harmonic tones. c. fundamental tone. d. sound intensity.
29. The human ear can distinguish between sounds that are equal in pitch and intensity if their sources are different, because the fundamental tone is accompanied by harmonic tones, which are
- a. higher in intensity and frequency.
b. lower in intensity and higher in frequency.
c. lower in intensity and frequency.
d. higher in intensity and lower in frequency.

30. The figure represents the relation between the intensity of sound and the square of amplitude of vibration of a vibrating body.



31. waves are non-audible sounds.

- a. Infrasonic b. Ultrasonic c. Sonic d. (a) and (b)

32. The human ear can hear sounds of frequency

- a. 50 KHz. b. 30 KHz. c. 300 Hz. d. 5 Hz.

33. The dolphin's trainer uses a whistle producing a sound which can be heard by dolphins and cannot be heard by man, the frequency of such sound equals Hertz.

- a. 20 b. 2000 c. 1000 d. 25000

34. A sound wave of frequency 30000 cycle/sec. is called wave.

- a. sonic b. infrasonic c. ultrasonic d. radio

35. The frequency of the point (X) is equal to Hertz.

- a. 20 b. 20000
c. 200 d. 2000

Ultrasonic waves
X
Sonic waves
Infrasonic waves

36. Ultrasonic waves are used in

- a. breaking down kidney and ureter stones. b. sterilizing food.
c. discovering landmines. d. (a), (b) and (c) are correct.

37. Doctors use waves, which have frequency to break down kidney and ureter stones.

- a. less than 20 Hz b. equal to 20 Hz c. more than 20 KHz

2. Choose from column (B) the best match in column (A) :


(A)	(B)
1. The sound pitch	a. is the characteristic, by which the ear can differentiate between the sounds as strong or weak.
2. The quality of sound	b. is the property, by which the ear can distinguish between sharp and rough sounds.
3. The sound intensity	c. is the number of the complete vibrations in one second.
	d. is the characteristic, by which the ear can distinguish between sounds from different sources even if they are equal in intensity and pitch.

3. Put (✓) or (✗) and correct the incorrect ones :

1. The sound of the electric bell is the highest when it is put under a bell jar evacuated from the air. ()
2. The sound velocity through liquids is less than that through gases. ()
3. If the speed of sound through air = 340 m/sec. and the frequency of a vibrating body = 170 Hz, so the wavelength = 2 metres. ()
4. The human ears can distinguish between sounds through two different factors only sound pitch and sound type. ()
5. As the length of the vibrating string decreases, the frequency of the produced sound increases. ()
6. The type of sound depends on the distance between the ears and the sound source. ()
7. The sound intensity becomes fainter gradually as we move towards the source of sound. ()
8. As the distance between the ears and the sound source is doubled, the intensity of sound increases four times. ()
9. As the amplitude of a vibrating body is doubled, the intensity of sound increases four times. ()
10. The sound intensity decreases, when the source of sound touches an empty box. ()
11. The intensity of sound will be stronger, if sound direction is against the air flow. ()
12. The ear can distinguish between sounds of different sources of the same frequency and intensity by their fundamental tones. ()
13. The sound quality is the property by which the ears can distinguish between strong and weak sounds. ()
14. Sonic waves have frequencies ranging from 20 Hz to 20000 Hz. ()
15. Sonic waves are used in sterilizing food substances. ()
16. Sound wave of frequency 15000 Hz is audible sound. ()

4. Write down the scientific term :

1. The external factor which affects the ears causing the sense of hearing.
2. Longitudinal waves produced due to the vibration of bodies and stop when the vibrating bodies stop their vibration.
3. The distance which is covered by the sound waves in one second.
4. A tone of regular frequency that is produced from reed pipe.
5. A tone of irregular frequency that is produced from loudspeakers.
6. • A property of sound by which the ears can distinguish between sharp and rough sounds.
• A property of sound that is directly proportional to the frequency of the sound source.
7. An instrument used to determine the frequency of unknown sound tone.

8. • The characteristic by which the ears can differentiate between strong and weak sounds.
 - The property of sound that is directly proportional to the square of the amplitude of vibration of the sound source.
9. Sound intensity at a certain point is inversely proportional to the square of the distance between this point and the source of sound.
10. The measuring unit of the sound intensity.
11. The measuring unit of noise intensity.
12. The material used for making ears plugs.
13. The property by which the human ears can distinguish between sounds from different sources even if they are equal in intensity and pitch.
14. The tones accompanying the fundamental tone but they are higher in pitch and less in intensity.
15.  Sound waves of frequencies less than 20 Hertz.
16. Sound waves of frequencies more than 20000 Hertz.
17. Sound waves of frequencies ranging between 20 to 20000 Hz.
18. Sound waves which accompany the blowing of storms that preceding rainfall.
19. Sound waves which are used in breaking kidney and ureter's stones.
20. Sound waves used for sterilization of the food and water.

5. Complete the following statements :





1. Sound originates from of bodies.
2. Sound is considered from waves , because it needs a medium to travel through.
3. Sound waves propagate through the medium as spheres of and
4. Sound wave velocity = ×
5. The velocity of sound through solids is than that through gases and its velocity through gases is than that through liquids.
6. Sound wave which propagates through air with velocity 340 m/sec. and of frequency 20 Hertz, its wavelength equals
7. Musical tone is a sound of frequency which is produced from and
8. is a sound of frequency, which is produced from electric digger.
9. Ear plugs made of are used to avoid the hazards of in loud places.
10. The human ears can differentiate between the sounds through three different factors, which are sound , sound and sound
11. Sound of woman is so it is said that she has pitched sound.
12. Sound of a lion is so it is said that he has pitched sound.
13. Sharp tones have frequencies, while rough tones have frequencies.
14. The sound pitch depends on the of the
15. The sound pitch is a property by which the ear can distinguish between and voices.

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16. The frequency of the vibrating string is proportional to its length.
17. Savart's wheel is used to determine the of unknown sound tone.
18. When turning Savart's wheel with a speed of 600 rotation/minute, using a gear of 30 teeth, the frequency of the produced sound is
19. In Savart's wheel by using the same gear, the sound produced will be sharper by increasing its
20. In Savart's wheel, frequency = $\frac{\text{No. of rotations} \times \dots\dots\dots}{\dots\dots\dots}$
21. Shouting is a sound of intensity, while whispering is a sound of intensity.
22. The measuring unit of the sound intensity is, while that of noise intensity is
23. Among the factors affecting the sound intensity are, and
24. The intensity of sound at a certain point is measured by the quantity of sound energy falling in one second on at that point.
25. The sound intensity at a point is proportional to the square of the distance between that point and the sound source, which is known as
26. When the distance between the sound source and the ear two times, the sound intensity decreases times.
27. When the amplitude of sound wave vibration is doubled, the intensity of sound four times.
28. The sound intensity by decreasing the density of the medium and when the vibrating body touches a box.
29. The intensity of sound when the direction of sound waves propagation is in the opposite direction of wind.
30. The human ears can distinguish between sound from sources which are similar in frequency and intensity due to tones which associate the tone.
31. The fundamental tone is lower in and higher in than the harmonic tones.
32. The of sound is a property by which the ears can distinguish between sound of different sources even if they are equal in and
33. The frequency of sonic waves ranges between Hz and Hz, while the frequency of infrasonic waves is Hz and also, the frequency of ultrasonic waves is Hz.
34. The human ears can't detect the sound waves of frequencies less than and that of frequencies more than
35. sound waves accompany the blowing of storms that preceding rainfall.
36. Some animals such as, and can hear ultrasonic waves.
37. waves are used in medical diagnosis and in breaking and stones.

6. Give reasons for :

1. The explosions occurred on the Sun surface cannot be heard on the Earth.
2. The guardian dog puts its ears on the ground when it sleeps at night.
3. Sound can be heard from all surrounding directions.
4. The violin player changes the length of strings during his play.
5. The difference in frequency between the musical note (tone) and noise.
6. The tuning fork of frequency 251 Hz gives rougher sound than that produced by another tuning fork of 512 Hz.
7. When you use Savart's wheel, you change the speed of wheel rotation.
8. The intensity of sound decreases four times as the distance between the ears and sound source is doubled.
9. The intensity of sound decreases as the amplitude of the vibrating source decreases.
10. The intensity of sound increases when the sound source touches a resonance box.
11. The sound intensity which produced from a vibrating ruler will be decreased as time passes.
12.  Sound travelling in air has less intensity than that travelling in carbon dioxide.
13.  The piano sound differs from that of the violin even if they have the same intensity and pitch.
14. The human ears can hear sounds of frequencies ranging from 20 Hz to 20000 Hz.
15. Dogs can hear all sounds produced by man.
16. Man can't hear all sounds produced by dolphins.
17. Some sound waves cannot be heard by man.
18. The infrasonic waves are used for weather forecast.
19.   The use of ultrasonic waves in milk sterilization.
 - Ultrasonic waves are used to sterilize food and water.
20. The ultrasonic waves have medical uses.

7. What is meant by each of the following ?

- | | |
|--|---|
| 1. Sound. | 2. The velocity of sound. |
| 3.  The wavelength of a sound wave = 1.5 m. | 4.  Sound pitch. |
| 5. Sound intensity. | 6. Decibel. |
| 7. Sound quality. | 8. Inverse square law of sound. |
| 9.  Sonic waves. | 10. Infrasonic waves. |
| 11. Ultrasonic waves. | 12. Harmonic tones. |

8. What happens when ... ?

1. You decrease the length of the violin string during playing (concerning the frequency).
2. The number of rotations per second of Savart's wheel increases.
3. The distance between the sound source and the ears increases twice.
4. You move gradually towards a sound source.
5. The amplitude of vibrations of a sound source decreases.

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6. You put a vibrating tuning fork on a resonance box.
7. Operating an electric bell under a bell jar connected to a vacuum pump, then pump the air out of the jar gradually.
8. The sound direction is in the direction of air flow.
9. The sound direction opposes the direction of air flow.
10. The frequency of sonic waves decreases less than 20 Hz.
11. The frequency of sonic waves increases more than 20000 Hz.

9. What does these relations indicate ?

1. $\frac{\text{Distance covered by a sound wave}}{\text{Time in seconds}}$
2. $\frac{\text{Number of rotations}}{\text{Time in seconds}} \times \text{Number of gear teeth in Savart's wheel}$
3. Sound intensity (I) $\propto \frac{1}{\text{Square of the distance between the ear and the sound source (d}^2\text{)}}$
4. Sound wave frequency \times Wavelength

10. Mention an activity to show :

1. Sound pitch depends on its frequency.
2. Sound intensity increases when the sound source touches a resonance box.
3. The effect of medium density on sound intensity.


11. Problems :


1. A sound source produces 3600 cycles in 3 minutes. If its wavelength is 17 meters, find the velocity of this sound waves.
2. Calculate the wavelength of a sound wave of frequency 17 Hz, if the distance travelled by this wave in one second is 340 metres.
3. Savart's wheel rotates with a rate of 300 cycles per minute. A sound of frequency 600 Hz. is produced when an elastic plate touches the teeth of one gear. Calculate the number of teeth of the gear.
4. Calculate the number of the gear teeth of Savart's wheel, given that the frequency of the sound produced is 100 Hz. and the wheel rotates 30 cycles/min.
5. Find the number of rotations in 2 minutes made by Savart's wheel producing sound of frequency 300 Hz, if a metallic plate touches one gear of 100 teeth.
6. Savart's wheel produces a sound of frequency 200 Hz. when a metallic plate touches a gear having 50 teeth. Find the time in minutes taken by the wheel to make 360 rotations.


12. Variant questions :

- (1) Mention the factors on which the sound intensity depends. Show the relation between the sound intensity and each factor.

(2) Write down the mathematical relation that joins between each of the following :

1. Frequency, sound velocity and wavelength.
2.  The sound frequency and the number of teeth of the gear in Savart's wheel.

(3)  Mention one function or importance of Savart's wheel.

(4)  What is the scientific basis on which the following depends ?

The strings of the musical lute are fixed on a hollow wooden box.

(5) Mostafa rotates three toothed gears of Savart's wheel which differ in the number of their teeth as shown in the following table and he touches each gear alone by a thin metal plate :

Gear	The first	The second	The third
Number of teeth	50	90	115

Answer the following questions :

1. The roughest sound is produced when the metal plate touches the gear.
2. Calculate the frequency of sound produced when the metal plate touches the second gear which has 90 teeth and rotates by a rate of 200 cycles/min.

(6) Compare between sonic, ultrasonic and infrasonic waves.

From the point of view of :

- Their frequencies.
- Hearing by man.

(7) A person stands near an apparatus producing different sounds.

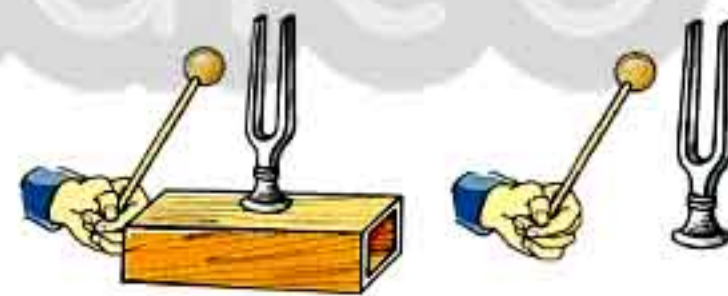
It produces sounds of the following frequencies : 10 Hz, 15 Hz, 25 Hz, 50 Hz and 25000 Hz, which of these sounds will be heard by man ? Why ?

(8) Sonar instrument produces ultrasonic waves :

1. What are the frequencies of such waves ?
2. Mention four uses of such waves.

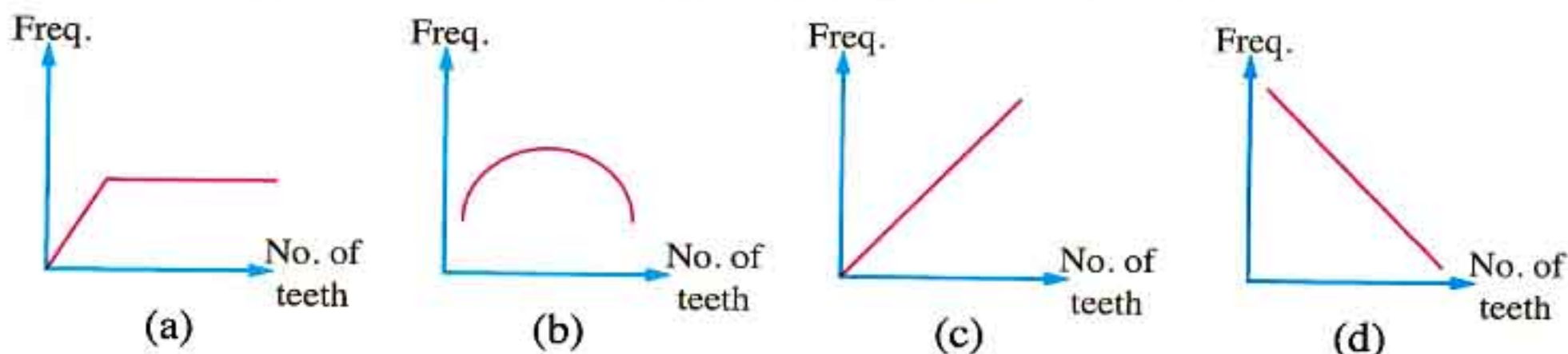
(9) Ahmed knocking on a tuning fork which installed on a resonance box, and when he repeated this step without using a resonance box he found that the produced sound is different in the two cases.

* Is this difference in the sound pick or in the sound intensity ? Give a reason.

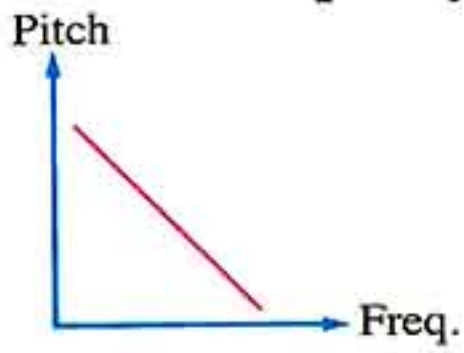


13. Study the following figures, then answer the questions :

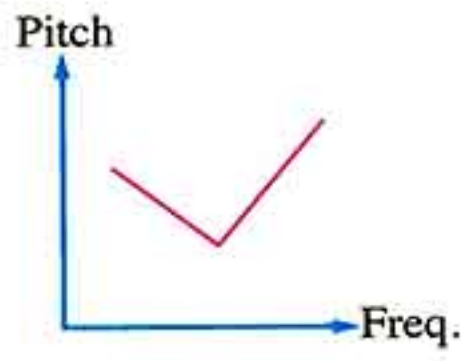
(1) In Savart's wheel, which of the following graphs represents the relation between the frequency and the number of gear teeth at constant speed ?



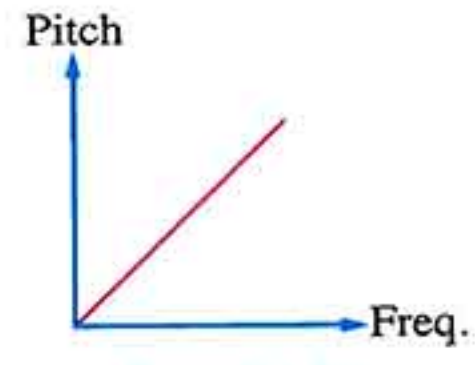
(2) Which of the following graphs represents the relation between the pitch of a sound and its frequency? Why?



Graph (1)

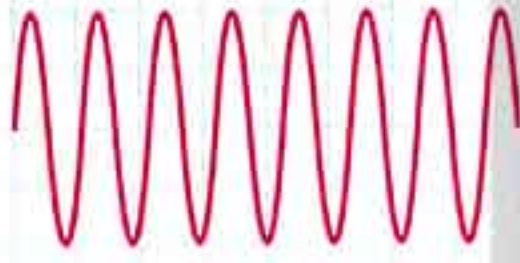


Graph (2)

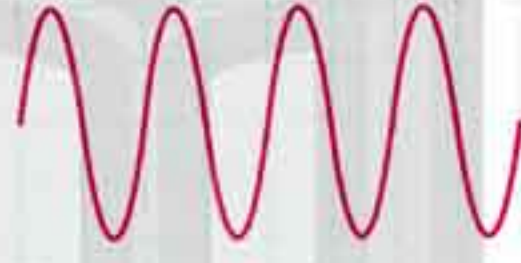


Graph (3)

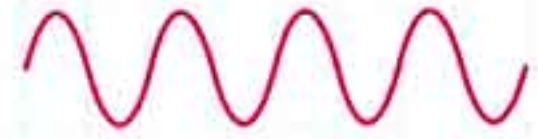
(3) Using the following figures, compare from the point of view of sound intensity and pitch between.



Wave (A)



Wave (B)



Wave (C)

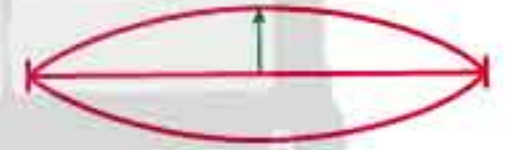
1. Sound wave (A) and sound wave (B).
2. Sound wave (B) and sound wave (C).

(4) Hoda pulled a stretched string from the middle as in the figure :

Hoda showed that the sound intensity is to be strong at case

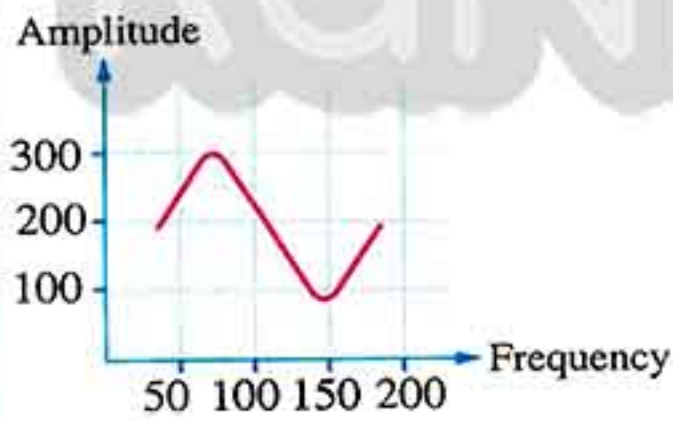


(a) Small amplitude

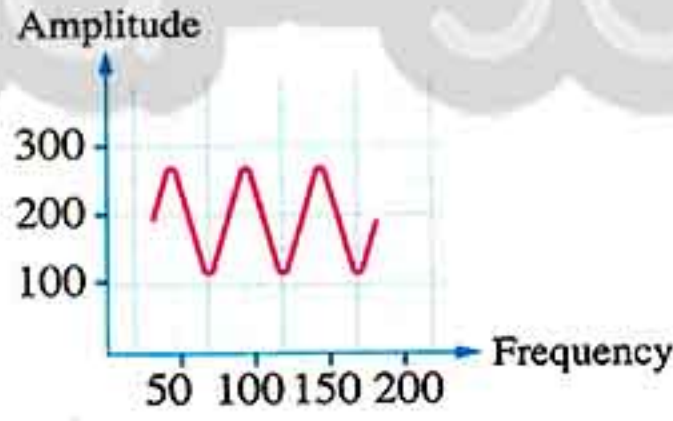


(b) Large amplitude

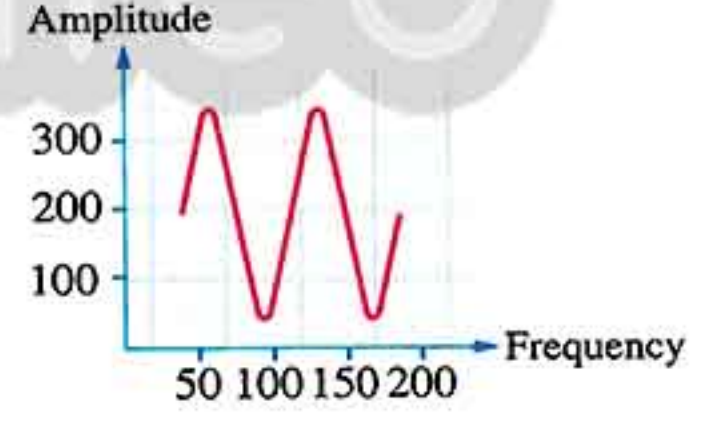
(5) The following graphs represent three different sound waves :



(a)



(b)



(c)

1. Which figure has the largest amplitude?
2. Which figure represents a sharper tone? Why?
3. Which figure represents a harsher tone? Why?
4. Which figure represents sound of higher intensity? Why?

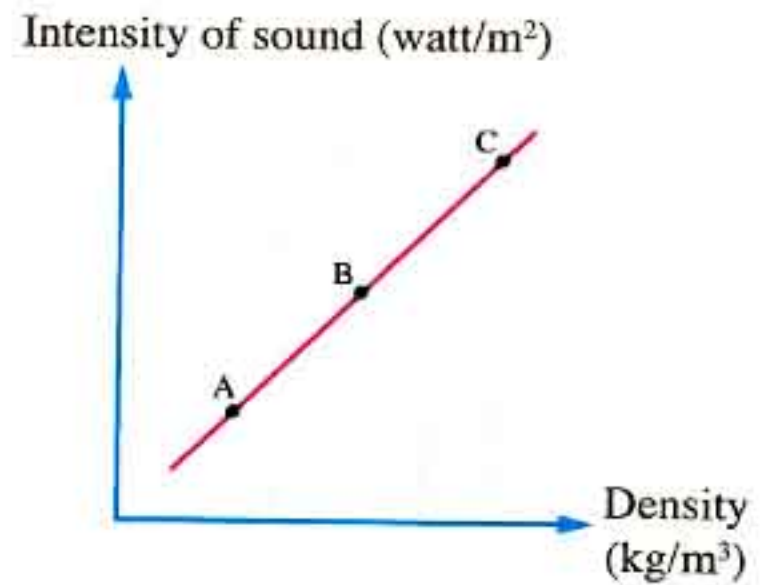
5. Complete :

- a. As the amplitude increases, the sound becomes
- b. As the frequency of sound decreases, the sound becomes of

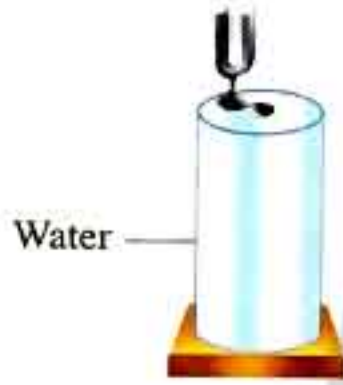
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(6) During an experiment to find the relation between the density of media (A, B and C) and the intensity of sound, complete :

1. The medium which gives strong sound is
2. The medium which gives faint sound is



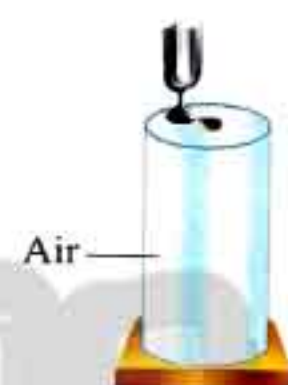
(7) There are three jars of volume 100 cm^3 , the 1st is full of water of density 1 gm/cm^3 , the 2nd is full of oil of density 0.8 gm/cm^3 and the 3rd is full of air of density 0.01 gm/cm^3 . Tap a tuning fork of known frequency and touch the stopper of each jar, so :



(a)



(b)



(c)

1. The sound of the highest intensity is the jar number (Give a reason)
2. The factor affecting the intensity of sound in this case is

(8) Study the given table and answer the following questions :

1. Complete the following :

- (1) The frequency of point (X) is Hz.
- (2) The frequency of point (y) is Hz.

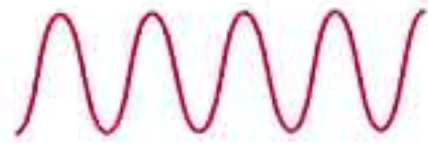
Area	Waves
3	Ultrasonic waves
y	
2	Sonic waves
X	
1	Infrasonic waves

2. Choose :

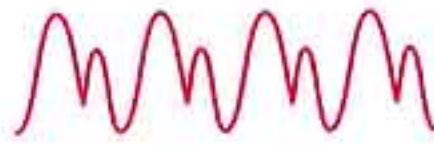
- (1) Frequency is in area (1).
 - a. 15 Hz
 - b. 22 Hz
 - c. 2000 Hz
 - d. 25000 Hz
- (2) Frequency is in area (2).
 - a. 15 Hz
 - b. 22 Hz
 - c. 25000 Hz
 - d. 30000 Hz
- (3) Frequency is in area (3).
 - a. 15 Hz
 - b. 22 Hz
 - c. 2000 Hz
 - d. 25000 Hz
- (4) Dogs and dolphins can hear waves.
 - a. infrasonic
 - b. sonic
 - c. ultrasonic
 - d. (a) and (b)
- (5) Bats can hear waves.
 - a. infrasonic
 - b. sonic
 - c. ultrasonic
 - d. (a) and (c)
- (6) Medical diagnosis instruments are made by using waves in area.
 - a. first
 - b. second
 - c. third
 - d. (a) and (b)

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(9) The following figures refer to three different sound waves.



Wave (a)



Wave (b)

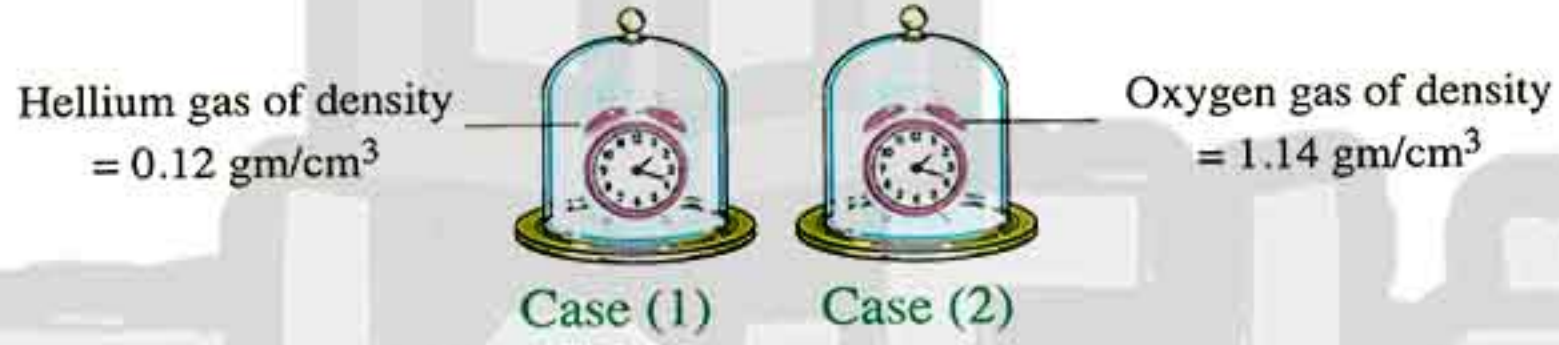


Wave (c)

Choose from these waves the wave produced from (give a reason) :

1. Tuning fork.
2. Hammer.
3. Musical instrument.

(10) Compare between the sound intensity of alarm in the opposite two cases, Give a reason.




Timss Questions



1. Calculate the wavelength of a wave produced by tuning fork vibrates in air if its tone is matched with a tone produced from Savart's wheel which rotates 1800 cycles / 2 minutes known that the number of its gear tooth is 34 teeth.
2. If tooth number of a Savart's wheel gear is 50 teeth and it rotates 300 cycles/min. to produce a certain tone. What is the number of rotation in 1.5 minutes of another wheel to produce the same tone if its gear tooth number is 60 teeth ?
3. Calculate the ratio between sound intensity at two points far from the sound source by 2 m , 6 m.
4. Suppose that there is an electromagnetic wave and another sound wave have the same frequency. Which of them has longer wavelength ? Why ?
5. Calculate the ratio between the frequencies of two different tones produced from Savart's wheel at the same period of time if you know that the number of teeth of the two gears of the wheel is 60 , 80 and the number of cycles of each of them in the experiment is 80 , 90 respectively.
6. If the sound intensity of sound produced from a source at a distance (d) meter from a person = (I) watt/m² so the sound intensity at a distance $(\frac{1}{2} d) = \dots\dots\dots I$
 a. $\frac{1}{4}$ b. $\frac{1}{2}$ c. 1 d. 4
7. Give a reason for :
 The intensity of sound when firing a shot on mountain top is less than it on the base of the mountain.

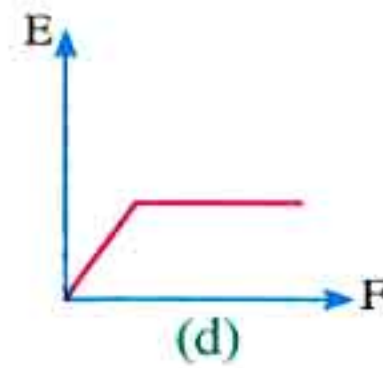
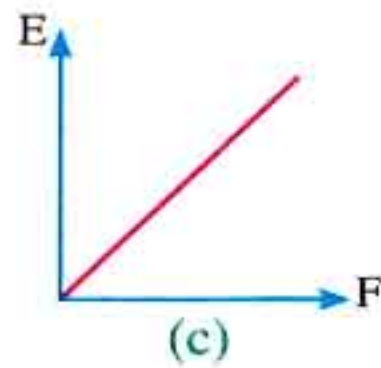
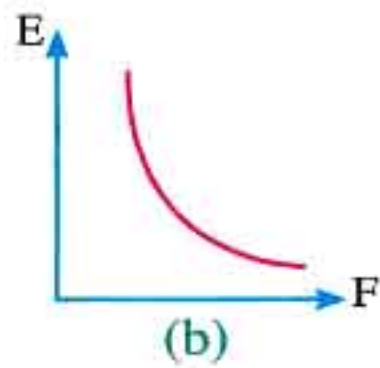
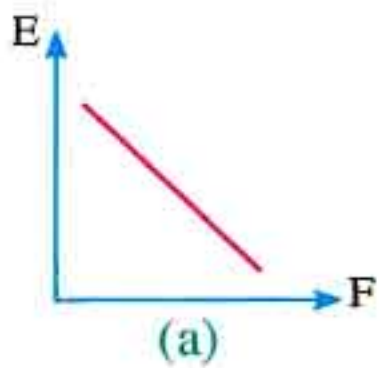
Questions

on lesson two

Questions signed by  have been taken from the school book.



1. Choose the correct answer :

- Light waves are waves.
 - mechanical transverse
 - electromagnetic transverse
 - electromagnetic longitudinal
 - mechanical longitudinal
- Which of these characteristics is not applied on light ?
 - It is an electromagnetic wave.
 - It needs a medium to travel through.
 - It travels in straight lines.
 - It has the ability to stimulate the sense of vision.
- The distance that light travels in a second is
 - light frequency.
 - light speed.
 - light intensity.
 - no correct answer.
- The main source of light on the Earth's surface is the
 - Sun.
 - Moon.
 - Star.
 - Candle.
- White light consists of spectrum colours.
 - nine
 - six
 - seven
 - eight
- colour has the lowest deviation.
 - Violet
 - Green
 - Red
 - Yellow
- The colour in the spectrum colours has the highest frequency.
 - violet
 - green
 - red
 - yellow
- If the frequency of red colour is 4×10^{12} Hz, the frequency of violet colour is $\times 10^{12}$ Hz.
 - 1.5
 - 3.5
 - 4
 - 7.5
- The photon energy = Planck's constant \times
 - photon frequency.
 - photon wavelength.
 - amplitude.
 - no correct answer.
- The quanta of colour has the lowest energy.
 - blue
 - violet
 - green
 - red
- Which of the following graphs represents the relation between the frequency of light (F) and its energy (E) ?



UNIT

2


12.  The quantum of energy of green light is the quantum of energy of yellow light.
a. greater than b. equal to c. less than d. no correct answer
13. Which of the following arrangements is correct concerning the increase of photon energy ?
- a. Violet → blue → yellow → red
b. Red → blue → violet → yellow
c. Violet → red → blue → yellow
d. Red → yellow → blue → violet
14. All of the following are among the characteristics of violet colour except
- a. it has the highest frequency of the spectrum colours.
b. it has the longest wavelength of the spectrum colours.
c. its photon has the largest energy.
d. it is the nearest colour to the base of the prism.
15. The medium which permits most light to pass through is called medium.
a. transparent b. translucent c. semi-transparent d. opaque
16. Media that we can see objects less clearly through are called
- a. opaque media. b. transparent media. c. translucent media. d. spectrum colours.
17. media don't allow light to pass through.
a. Transparent b. Translucent c. Semi-transparent d. Opaque
18. All of the following are examples of transparent media except
- a. air. b. tissue paper. c. glass. d. clear water.
19. Which one from the following doesn't permit the passage of light through it ?
- a. Air. b. Clear water. c. Flint glass. d. Milk.
20. Light can be easily transmitted through media.
a. transparent b. semi-transparent c. opaque d. (a) and (b)
21.  The human skin is considered as a /an medium.
a. transparent b. opaque c. translucent d. no correct answer
22. By increasing the thickness of the transparent medium, the quantity of light that passes through it
- a. decreases. b. increases.
c. remains constant. d. there is no correct answer.
23. Light travels in lines.
a. curved b. circular c. straight d. no correct answer
24. Light
- a. travels in straight lines. b. consists of compressions and rarefactions.
c. can be analysed. d. (a) and (c) are correct.

25. The light intensity of a surface is inversely proportional to the between the surface and the source of light.
- a. distance
b. square of the distance
c. cube of the distance
d. (a) or (b) is correct
26. When the distance between the source of light and the surface of a wall decreases, the light intensity on the surface
- a. decreases. b. increases. c. is doubled. d. remains constant.
27. If the distance between a surface and light source decreases to its half, the light intensity of the surface
- a. decreases to its one fourth. b. decreases to its half.
c. increases twice. d. increases four times.

2. Rewrite the following statements after correcting the mistakes :

1. Light is a mechanical transverse waves.
2. The velocity of light through space is 30000 km/sec.
3. White light is a mixture of five colours known as bright colours.
4. The glass prism is used to analyse the white light into nine spectrum colours.
5. The frequency of the green light is lower than that of yellow light.
6. Violet colour has the longest wavelength.
7. Yellow colour is the first colour in spectrum colours, but violet colour is the last one.
8. Al-Hassan Ibn Al-Haitham proved that the energy of light waves is composed of photons.
9. Energy of the photon = Planck's constant + Frequency of the photon.
10. The energy of the quanta of light is directly proportional to the wavelength of the light wave.
11. The media can be classified according to their ability to transmit light into transparent and opaque media only.
12. Transparent media allow a part of light to pass through them.
13. Air and pure water are examples of translucent media, but tissue paper and flint glass are examples of opaque media.
14. Milk, wood and cartoon are examples of transparent media.
15. The objects can be seen clearly through translucent media.
16. By increasing the thickness of the transparent medium, the quantity of light that passes through it increases.
17. Light travels in transparent media in the form of zigzag lines.
18. The intensity of light on a surface increases as the distance between the source of light and the surface increases.
19. The intensity of light on a surface is directly proportional to the distance between the light source and the surface.
20. As the distance between light source and a surface decreases to its one third, the intensity of light increases 3 times.

3. Write the scientific term of each of the following :


1. Electromagnetic waves stimulate the sense of vision when they reach the eye.
2. The distance covered by light in one second.
3. One of the components of the electromagnetic spectrum of wavelength ranges between 380 : 700 nanometres.
4. The main source of light energy on the Earth surface.
5. The splitting of white light into seven spectrum colours.
6. A mixture of seven spectrum colours.
7. A structure used in the analysis of light.
8. Seven colours are produced as a result of splitting of the white light.
9. The scientist who proved that the energy of the photon depends on its frequency.
10. • The colour which has the lowest frequency, longest wavelength and lowest energy.
• The colour which has the lowest deviation and it is the closest to the prism apex.
11. • The colour which has the highest frequency, shortest wavelength and highest energy.
• The colour which has the highest deviation and it is the closest to the prism base.
12. A physical quantity equals Planck's constant is multiplied by frequency.
13.  A medium doesn't allow light rays to penetrate through.
14. The media allow the passage of light through them.
15. The media allow the passage of a part of light through them and absorb the remaining part.
16. The amount of light falling perpendicular to a unit area of a surface in one second.
17. The light intensity of a surface is inversely proportional to the square of the distance between the surface and the source of light.

4. Complete the following statements :


1. Light is waves that travel through free space (vacuum).
2. Visible light is one of the components of electromagnetic spectrum of wavelength ranges between to nanometres.
3. The light velocity is the distance
4. is the main source of light energy on Earth's surface.
5. Light waves consist of and
6. White light consists of colours.
7. The glass prism is used to analyse the light into colours.
8. , orange , , green , blue , and violet are the seven spectrum colours.
9. is the nearest colour to the prism apex, while is the nearest colour to the prism base.
10. The colour has the highest frequency and the shortest wavelength, while the colour has the lowest frequency and the longest wavelength.

11. The frequency of blue colour is than the frequency of yellow colour, so the energy of yellow light photon is than the energy of blue light photon.
12. The scientist proved that the energy of light waves is composed of energy quanta known as
13. The energy of the photon is proportional to the of light wave.
14. Energy of photon = ×
15. Light is used in home decorations like to illuminate artifacts and to concentrate light for reading.
16. Media are classified according to their ability to allow light to pass through into medium , medium and medium.
17. The medium which allows most light to pass through is called
18. and are examples of the transparent media.
19. The glass cup is an example of transparent medium , while flint glass is an example of medium.
20. Cartoon and are examples of medium that don't permit light to pass through.
21. By increasing the of the transparent medium , the quantity of light that passes through it
22. Light travels through the media in lines.
23. The light intensity is the amount of light
24. The light intensity of a surface is proportional to square of the distance between the surface and the light source.
25. As the distance between the light source and the surface increases twice, the intensity of light of the surface to its



5. Give reasons for :

1. Light can travel through free space.
2. Light waves are considered as electromagnetic waves.
3. Formation of spectrum colours.
4. The light of the Sun is a complex light.
5.  The energy of red light photon is less than that of orange light photon.
6. The energy of violet photon has the maximum energy in spectrum colours.
7. The energy of violet photon is larger than that of blue photon.
8. Objects can be seen clearly through transparent medium.
9. Objects cannot be seen clearly through the frosted glass.
10. A clear glass is a transparent medium.
11. A tissue paper is a translucent medium.
12. Aluminium foil is an opaque medium.


UNIT
2

13. Wood doesn't allow the passage of light through it.
14.  The inability to see the impurities present in black honey.
15. The intensity of light of a surface decreases to its quarter as the distance between the surface and light source is doubled.

6. What is meant by ... ?

1. Light.
2. The velocity of light is 3×10^8 m/sec.
3.  Visible light.
4. Analysis of light.
5. Transparent medium.
6. Translucent medium.
7. Opaque medium.
8.  Light intensity.
9. The inverse square law of light.

7. What happens when ... ?

1. A compact disc (CD) with shiny side is put to face sunlight.
2.  Incidence of a white light ray on one face of a triangular glass prism.
3. The thickness of the transparent medium increases concerning the quantity of light that passes through it.
4. Light falls on a transparent medium.
5. Light falls on a translucent medium.
6. Light falls on an opaque medium.
7. You look at a picture through a clear glass in a window.
8. You look at a picture through a frosted glass.
9. You look at a picture through a metallic sheet.
10. The distance between the source of light and a surface increases concerning the light intensity.
11. The distance between the light source and a surface is doubled concerning the light intensity.

8. Choose the unsuitable word or statement out, then express the rest of the words or statements with something proper :

1. Yellow / Blue / White / Violet / Red.
2. Glass / Ceramic / Water / Air.
3. Frosted glass / Tissue paper / Clouds / Water.
4. Wood / Concrete / Air / Metal.
5. Light travels in straight lines / The speed of light differs in different media / White light consists of seven spectrum colours / Light travels through materialistic media only.

9. Explain an activity to :

1. Demonstrate that light travels in straight lines through transparent media.
2. Show the light intensity of a surface changes by changing the distance between the surface and the light source.

10. Variant questions :

(1) Arrange the spectrum colours ascendingly according to :

- a. Frequency.
- b. Deviation in the triangular prism.

(2) Mention the use(s) of :

- a. Light.
- b. Triangular glass prism.

(3) Write down the mathematical relation that joins between :

The photon frequency of a wave and its energy.

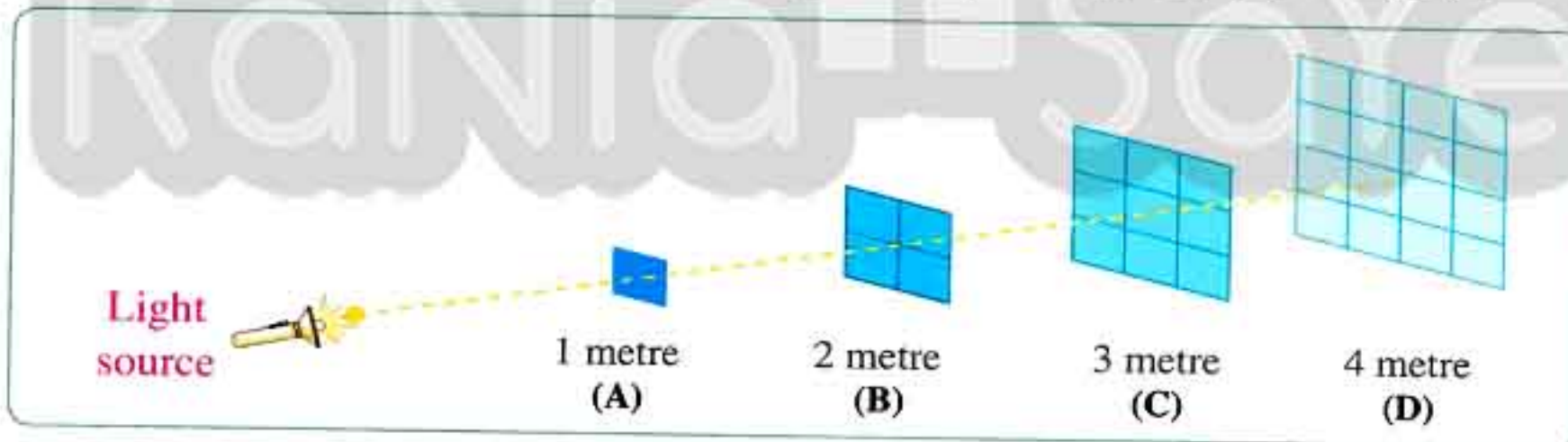
(4) Compare between : Transparent medium, translucent medium and opaque medium.

11. Study the following figures, then answer the questions :

(1) In the following figure, the light intensity of the surface at point (A) equals the unity.

Choose from the following values : $(\frac{1}{2} - \frac{1}{3} - \frac{1}{4} - \frac{1}{6} - \frac{1}{9} - \frac{1}{12} - \frac{1}{16})$

What is suitable to be the light intensity at the points, (B) , (C) and (D) ?

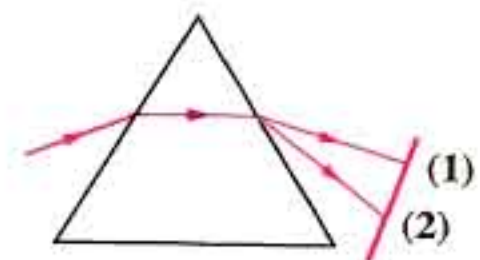


(2) Look at the opposite figure, then answer :

1. The figure shows the separation of into by
2. Mention the names of the spectrum colours in the right order.



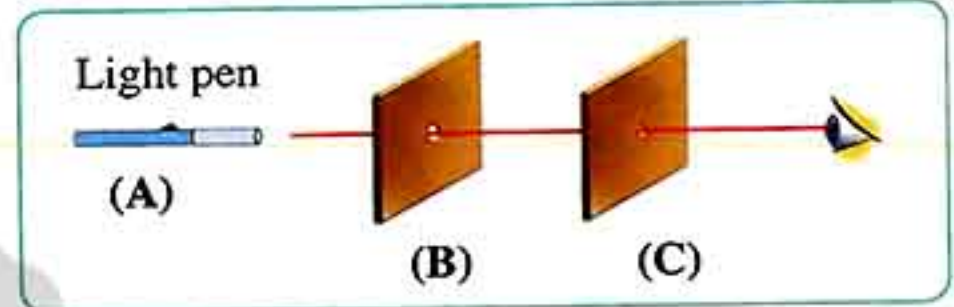
(3) In the opposite figure. Which ray represents the red colour and which ray represents the violet colour ?



UNIT
2

(4) Study the following figure, then answer the following questions :

1. Light is one of the energy forms and its energy depends on the frequency of its waves, so the lowest frequency is colour, while the highest frequency is colour. *(Complete)*
2. The given drawing is for an activity proves that light travels in *(Complete)*
3. What will happen if we move part (C) slightly to the right ?
4. Copy the drawing in your answer sheet using an arrow to show the direction of light propagation.



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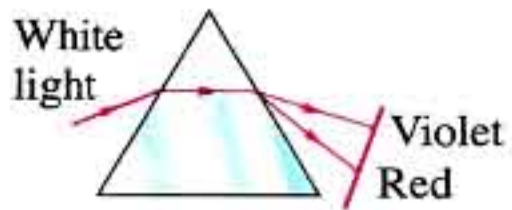
Rania Sayed

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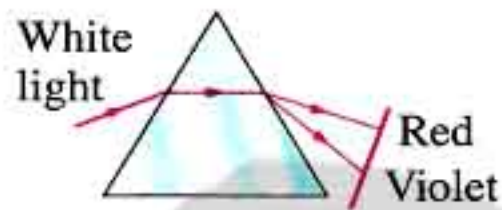


1. Choose the correct answer :

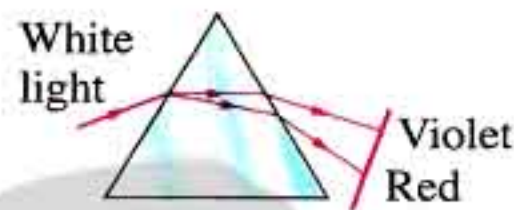
1. The figure represents the analysis of white light by a triangular glass prism.



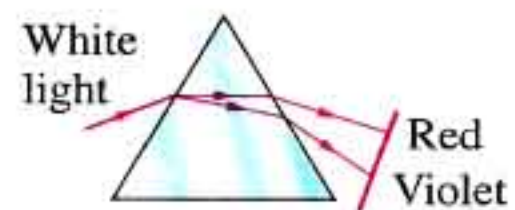
(a)



(b)



(c)



(d)

2. The ratio between the frequency of red light to the frequency of violet light is one.

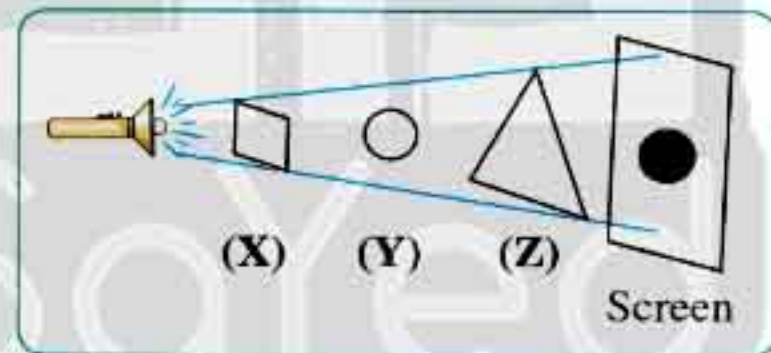
- a. more than b. equal to c. less than

3. The periodic time of green light wave is the periodic time of red light wave.

- a. more than b. equal to c. less than

4. In the following figure, the shadow formed on the screen indicates that (X) , (Y) and (Z) are made of respectively.

- a. iron , flint glass and transparent plastic
b. glass , rubber and cartoon
c. cartoon , plastic and glass
d. transparent glass , rubber and transparent plastic




2. Mercury lamp is preferred in headlights of cars. Give a reason.

3. If the distance between the Earth and the Sun is 1.5×10^8 km, Calculate the time taken by sunlight to reach the Earth in minute unit.

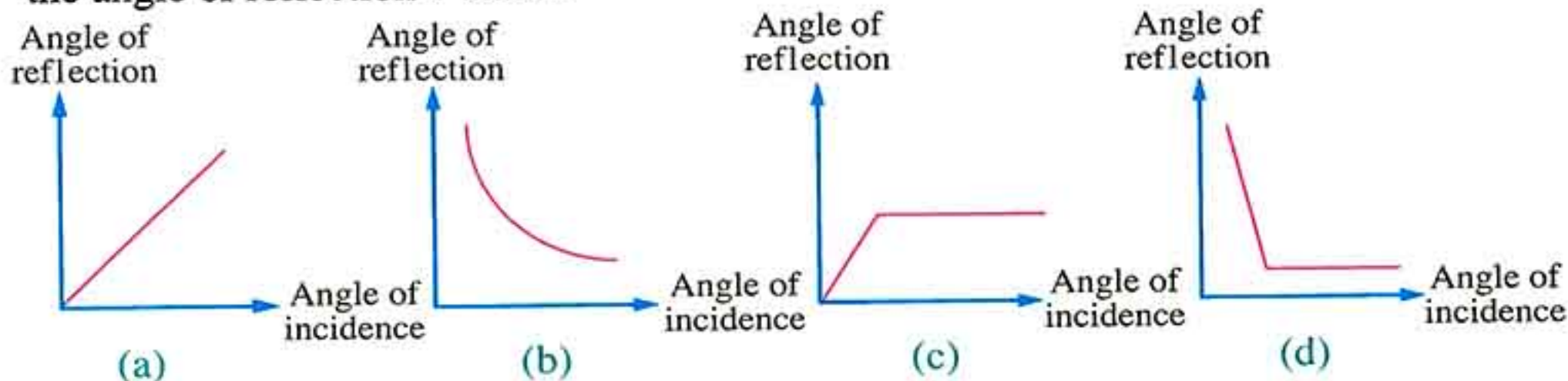
Questions

on lesson three

Questions signed by  have been taken from the school book.

1. Choose the correct answer :

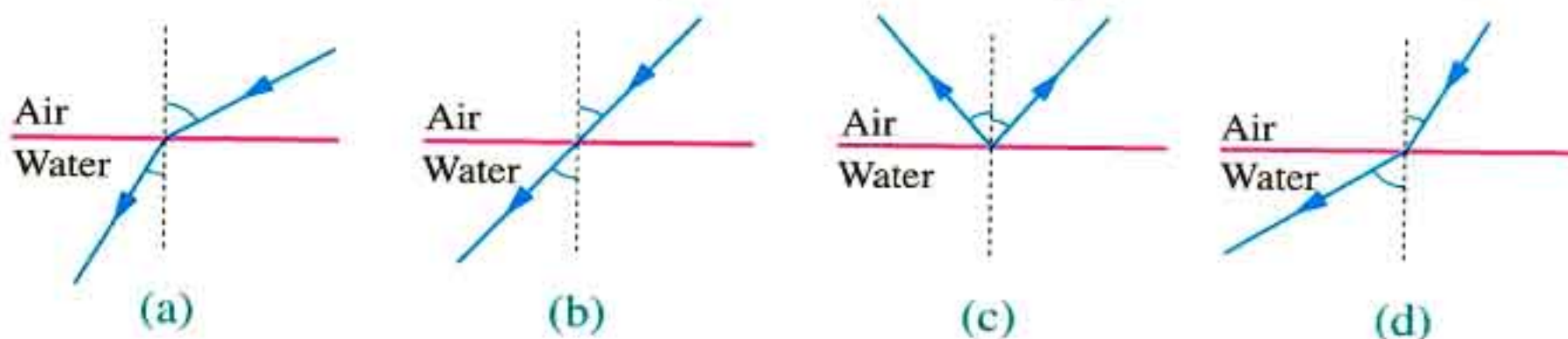
- Light plays an important role in the formation of inverted images of the objects on the road when rain falls.
 - velocity
 - refraction
 - reflection
 - frequency
- In reflection, the reflected rays are reflected in many directions.
 - irregular
 - uniform
 - regular
 - total internal
- A regular reflection happens when light rays fall on
 - a woolen jacket.
 - a stainless steel sheet.
 - a leaf of a tree.
 - a piece of leather.
- Light is reflected when it falls on a smooth bright surface.
 - regularly
 - irregularly
 - and refracted
 - and scattered
- Light is reflected when it falls on a rough surface.
 - regularly
 - irregularly
 - and refracted
 - in one direction
- The angle between the reflected ray and the line perpendicular to the reflecting surface at the point of incidence is called the angle of
 - emergence.
 - incidence.
 - refraction.
 - reflection.
- If the angle between the incident light ray and the reflected light ray is 90° , so the angle of incidence equals
 - 0°
 - 30°
 - 45°
 - 90°
- If the angle between a reflected light ray and a reflecting surface is 30° , so the angle of reflection will be equal to
 - 15°
 - 30°
 - 60°
 - 90°
- If you know that the incident ray which falls perpendicular on a reflecting surface reflects on itself, so the angle of reflection is equal to
 - 0°
 - 90°
 - 120°
 - 180°
- The angle of incidence of light is its angle of reflection.
 - larger than
 - smaller than
 - equal to
 - no correct answers
- Which of the following graphs represents the relation between the angle of incidence and the angle of reflection ?



12. The ability of the transparent medium to refract the light is called the of the medium.
 a. refractive index b. density c. optical density d. viscousity
13. The is the change in the direction of light rays when light passes from a transparent medium to another transparent medium of different optical density.
 a. light reflection b. light refraction
 c. light absorption d. light separation
14. The angle between the refracted light ray and the normal at the point of incidence on the separating surface is
 a. the angle of reflection. b. the angle of refraction.
 c. the angle of incidence. d. no correct answer.
15. The angle between the emergent light ray and the normal at the point of emergence on the interface is called the angle of
 a. incidence. b. reflection. c. refraction. d. emergence.
16. Light refraction is due to the difference in through different media.
 a. sound intensity b. nature of the surface
 c. light velocity d. all the previous answers
17. Which of the following figures represents the refraction of light in a rectangular glass block? Give a reason.



18. The angle of incidence is greater than the angle of refraction when a light ray travels from
 a. air to water. b. air to glass.
 c. water to air. d. (a) and (b) are correct.
19. When light ray travels from air to water, it
 a. refracts near the normal. b. refracts far from the normal.
 c. passes without refraction. d. reflects.
20. Which of the following figures represents a correct light refraction?



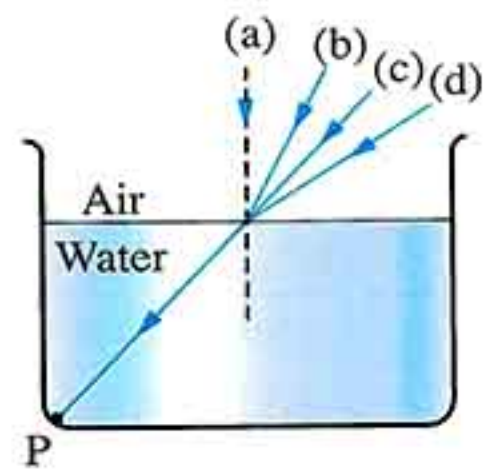
UNIT

2

21. In which direction should a spotlight be directed to the water surface to be inspected at point (p) ?

- a. (a)
c. (c)

- b. (b)
d. (d)



22. The absolute refractive index of any material is always

- a. more than one. b. less than one. c. equal to one. d. equal zero.

23. We have got the refractive index of four materials. Which result of the four is incorrect ? (Give a reason)

- a. 0.8 b. 1.3 c. 1.5 d. 1.8

24. The absolute refractive index is the ratio between the speed of light through air and

- a. the speed of light through another medium.
b. the speed of light through the same medium.
c. the speed of sound through the same medium.
d. no correct answer.

25. A pencil seems broken when it is placed in a glass cup of water due to the of light.

- a. reflection b. refraction
c. total internal reflection d. no correct answer

26. When a boy looked at a fish under water, it seemed to be in the shown position.

Which position is the real one ?

- a. A , B
c. E

- b. D
d. C , E



27. From the natural phenomena that is resulted from the refraction and reflection of light on the desert roads is

- a. echo. b. mirage.
c. seeing objects higher than its normal position.
d. no correct answer.

2. Choose from column (B) what suits it in column (A) :

1.	(A)	(B)
	1. Angle of incidence is 2. Angle of reflection is 3. Angle of refraction is 4. Light reflection is 5. Light refraction is	a. the change of the path of light ray when it moves between two media with different optical densities. b. the angle between the extensions of both, the incident ray and the emergent ray. c. the angle between the incident light ray and the normal to the surface. d. the change in the direction of light ray in the same medium, when it falls on a reflecting surface. e. the angle between the reflected light ray and the normal to the surface. f. the angle between the refracted light ray and the normal to the surface.


2.	(A)	(B)
	1. The incident light ray that is perpendicular to the separating surface between two different transparent media 2. The incident light ray on a surface of plane mirror 3. Fish that swim in water are seen 4. A light ray passes inclined from a transparent medium to another transparent medium	a. higher than their real positions. b. it reflects on itself. c. it refracts. d. does not refract (passes in a straight line).




3. Put (✓) or (×) , then correct what is wrong :

- Light refraction is the rebounding of light rays in the same medium on meeting a reflecting surface. ()
- Light reflection plays an important role in the formation of inverted images of trees on the road when rain falls. ()
- In uniform reflection, the light rays are reflected directly in one direction. ()
- Reflection of light from rough surfaces is called regular reflection. ()
- The reflection of light on a piece of white paper is a regular reflection, while the reflection of light in a plane mirror is an irregular reflection. ()
- The angle of reflection of a light ray falls perpendicular on a reflecting surface equals 90° ()

7. Light reflects when it travels from a transparent medium to another one of different optical density. ()
8. The ability of the transparent medium to refract light is called the refractive index of the medium. ()
9. The optical density of a medium differs from one medium to another due to the change in the light intensity through such medium. ()
10. The light ray refracts near to the normal when it travels from air to glass. ()
11. When light ray travels from air to water, the angle of incidence is greater than the angle of refraction. ()
12. The optical density of the medium is the ratio between the velocity of light through air to the velocity of light through the medium. ()
13. The reason for light refraction is that its velocity is equal in the different transparent media. ()
14. The absolute refractive index of any transparent medium is always greater than one. ()
15. The velocity of light through any transparent medium is less than that through air. ()
16. The fish is seen higher than its real position in the fish tank. ()
17. Objects on the desert road sides seem as if they had inverted images on a wet area due to the mirage phenomenon. ()

4. Write the scientific term of each of the following statements :

1. The rebounding (returning) of light waves in the same medium on meeting a reflecting surface.
2. A smooth or rough surface, at which the reflection of light takes place.
3.  The reflection in which the light rays recoil in one direction, when falling on a glistening surface.
4. The reflection in which the light rays recoil in many directions, when falling on a rough surface.
5. A narrow light beam, which is represented by a straight line that is reflected from the reflecting surface at the point of incidence.
6. The angle between the incident light ray and the normal at the point of incidence on the separating surface.
7. The angle between the reflected light ray and the normal at the point of incidence on the reflecting surface.
8. Angle of incidence = angle of reflection.
9. The incident light ray, the reflected light ray and the normal on the surface of reflection at the point of incidence, all locate in one plane perpendicular to the reflecting surface.



10.  The ability of the medium to refract light rays.
11.  Changing the path of light when it travels from a transparent medium to another transparent medium of different optical density.
12. The angle between the refracted light ray and the normal at the point of incidence on the separating surface.
13. The angle between the emergent light ray and the normal at the point of emergence on the interface.
14.  The ratio between the velocity of light through air to the velocity of light through another transparent medium.
15. The position, at which the submerged object in water is seen slightly above its real position.
16. The phenomenon that appears in the desert as a result of refraction and reflection of light on the desert roads.

5. Complete the following statements :

1. The light reflection is classified into two types which are and
2. In reflection, the reflected rays are in one direction, while in reflection, the reflected rays are in different directions.
3. When parallel light rays meet a rough surface, they reflect in directions and this is called reflection.
4. The and the thin aluminium sheet are examples of smooth surfaces which cause reflection.
5. A woolen jacket causes reflection of light rays, while a stainless steel sheet causes reflection of light rays.
6. The angle of is the angle between the incident ray and the line perpendicular to the reflecting surface at the point of
7. The first law of light reflection states that
8. The incident light ray, the light ray and the normal to the surface of reflection at the point of incidence, all locate in one plane to the surface.
9. When a light ray falls on a reflecting surface, the angle between the incident ray and the reflecting surface is 35° , therefore the angle of reflection equals and the angle between the incident ray and the reflected ray equals
10. When a light ray falls perpendicular on a reflecting surface, it reflects, because the angle of incidence and the angle of reflection equal
11. The optical density of a medium differs from one medium to another due to the change in the through such medium.
12. Light is the change of light path when it travels from a transparent medium to another transparent medium of different
13. The angle of is the angle between the refracted light ray and the at the point of incidence on the separating surface.

14. When light ray travels from a medium of optical density to another of optical density, it refracts far from the normal on the separating surface.
15. If the angle of incidence is more than the angle of refraction, this means that the light ray travels from a medium of optical density to another of optical density.
16. When light ray travels from water (or glass) to air, the angle of is greater than the angle of
17. When light ray travels from air to water, it refracts the normal and the angle of refraction is than the angle of incidence.
18. When light ray falls perpendicular to the interface between two transparent media different in optical densities, it to the other medium without
19. The absolute refractive index of the medium is the ratio between to
20. As the optical density of a medium is high, so the refractive index of such medium is
21. From the natural phenomena that are related to the reflection and refraction of light are , and
22. A pencil which is partially immersed in water appears as being due to the of light rays coming from the immersed part in water.
23. When we look at a fish in a trough filled with water, its position will be higher than its position. This is due to light
24. When you look at a coin in a glass of water, its position appears to be lower than the position.
25. is a natural phenomenon that takes place on desert roads at noon in summer days due to light refraction and reflection.

6. Give reasons for :

1. The formation of inverted images of the trees and buildings on the road when rain falls.
2. A leather jacket produces irregular light reflection, while a stainless steel plate produces regular light reflection.
3.  The light ray that falls perpendicular on a glistening surface reflects on itself.
4. The velocity of light changes from one medium to another.
5. The light refracts when it travels from a medium to another.
6. When a light ray travels from air to water, it refracts near the normal.
7. When a light ray travels from glass to air, it refracts far from the normal.
8. When a light ray passes through a glass prism, it refracts.
9. The absolute refractive index of any transparent medium is always greater than one.
10.  The ray falling perpendicular on the separating surface between two media different in the optical density doesn't refract.

11. When light ray transfers from a transparent medium to another it may not refracted.
12. The pencil, which is partially immersed in water appears as being broken.
13. The submerged object in water is seen in an apparent position above its real position.
14. The floor of the swimming pool appears higher than its real position.
15. To see a coin which has fallen in a beaker filled with water in its real position, we must look at it vertically.

7. Define :

1. Light reflection.
2. Reflecting surface.
3. Regular reflection of light.
4. Irregular reflection of light.
5. Angle of incidence.
6. Angle of reflection.
7. Optical density of a medium.
8. Light refraction.
9. Angle of refraction.
10. Angle of emergence.
11. The absolute refractive index of a medium.
12. The refractive index of a medium is high.
13. Mirage phenomenon.

8. What is meant by ... ?

1. The angle of reflection of light ray = 40°
2. The angle of refraction of light ray = 20°
3. The angle of emergence of light ray = 30°
4. Absolute refractive index of water is 1.33

9. What happens when ... ?

1. Incidence of light rays on a rough surface.
2. Incidence of light rays on a smooth glistening surface.
3. Light ray is incident in a plane mirror by an angle of incidence equals 30°
4. Light ray falls perpendicular on a reflecting surface.
5. Light ray travels from a transparent medium to another one of different optical density.
6. Light ray travels from glass to air.
7. Light ray travels from air to glass.
8. Light ray falls perpendicular to the interface between two transparent media of different optical densities.
9. You look at a pencil partially immersed in water.
10. You look at a coin in a glass full of water.

10. Show by drawing :

1. The path of light ray that falls on a reflecting surface with an angle of incidence equals 30°
2. The path of light ray falling perpendicular on a reflecting surface.
3. The path of light ray that is incident on one face of a rectangular glass block.
4. The path of light ray which travels from water to air.
5. The path of light ray which travels from a transparent medium of lower optical density (air) to another of high optical density (glass).
6. The path of light ray falling perpendicular to the interface between two transparent media of different optical densities.
7. The path of rays by which Ahmed sees the image of the coin, which is put in a basin containing water (from one side).

11. Write the physical relation between each of the following :

1. The light velocity in a medium and the refractive index of its material.
2. The angle of incidence and the angle of reflection of light.

12. Compare between :

Regular reflection and irregular reflection.

13. Explain with drawing an activity to :

1. Conclude the two laws of light reflection.
2. Demonstrate the light refraction.

14. Problems :

1. If the angle between the incident and reflected rays is 140° , find the angle of incidence and the angle of reflection.
2. Calculate the velocity of light through glass if you know that the velocity of light through air is 3×10^8 m/sec. and the absolute refractive index of glass is 1.5
3. Calculate the absolute refractive index of diamond given that the speed of light through it is 1.25×10^8 m/s. Knowing that the velocity of light through air is 3×10^8 m/sec.
4. If the absolute refractive index of water is $\frac{4}{3}$ and the velocity of light through water is 2.25×10^8 m/s calculate the velocity of light through air.

15. Study the following figures, then answer the questions :

(1) Look at the following figures, then complete :

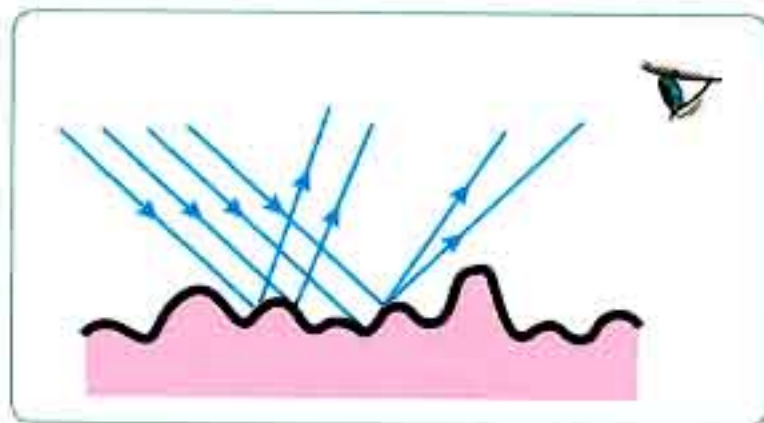


Fig. (a)

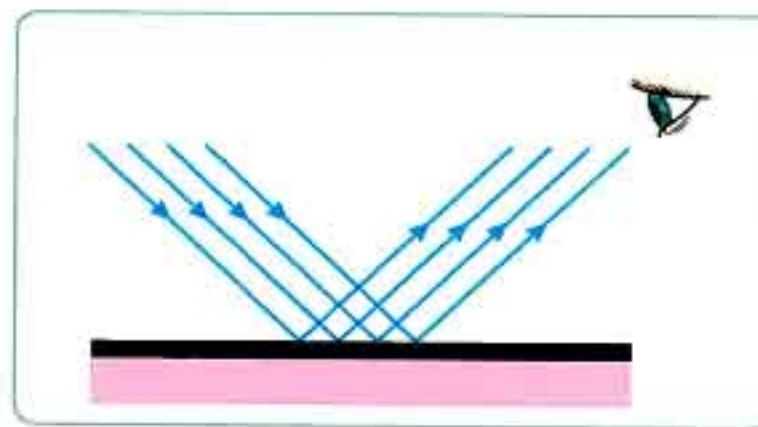
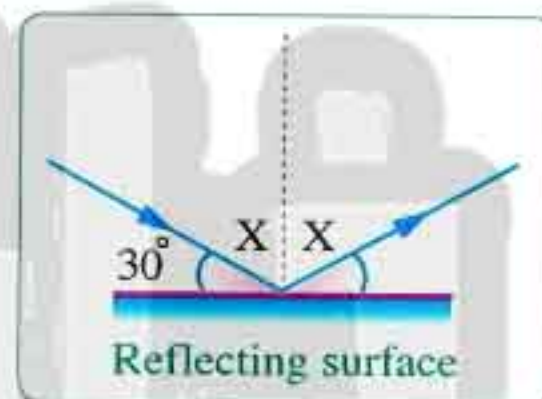


Fig. (b)

1. The two figures represent
2. Figure (a) represents, so the reflecting surface may be
3. Figure (b) represents, so the reflecting surface may be

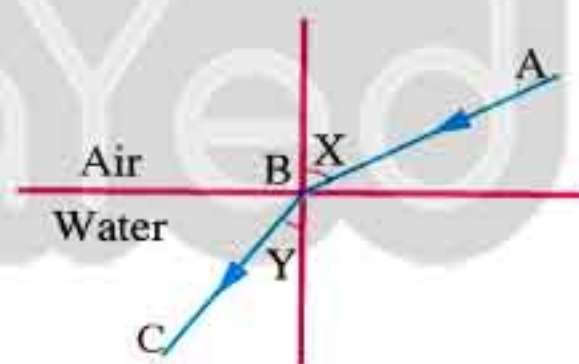
(2) From the opposite figure :

1. Calculate the angle of reflection.
2. Re-draw this figure in your answer paper and show the angle of incidence and the angle of reflection.
3. What can you conclude from this figure ?

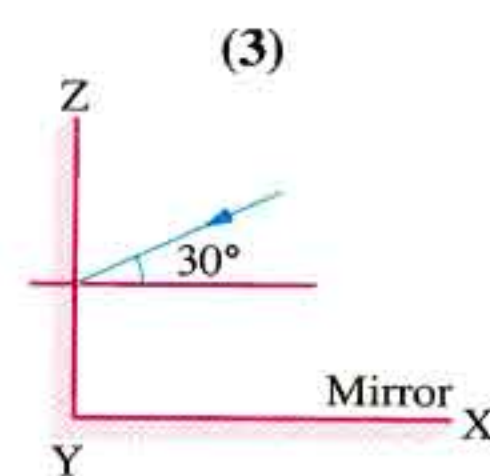
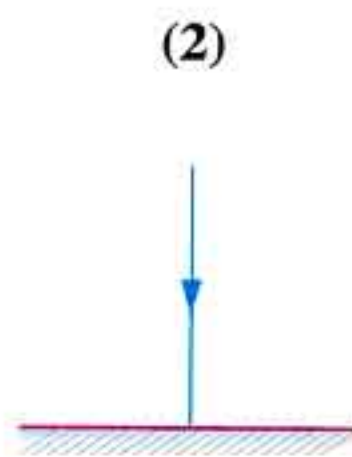
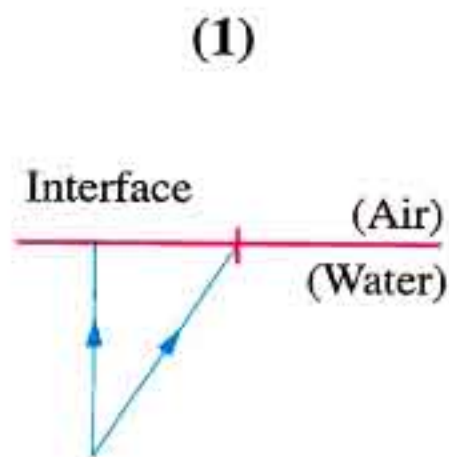


(3) From the opposite figure, complete the following statements :

1. The ray (AB) represents
2. The ray (BC) represents
3. Angle (X) is
4. Angle (Y) is

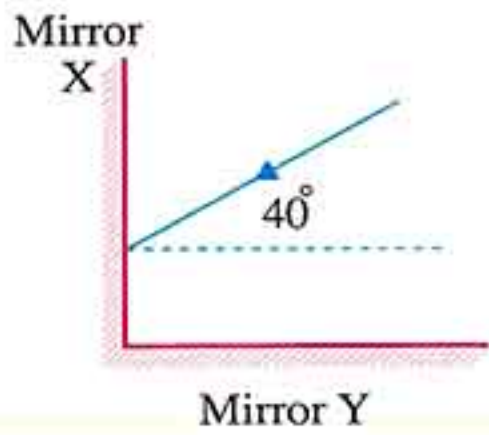


(4) Complete the following figures after redrawing them in your answer sheet and complete the labels of each one :

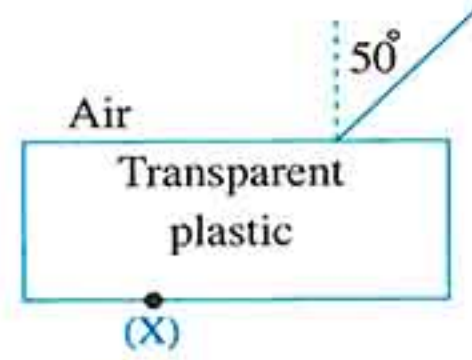


UNIT
2

- (5) Complete the path of rays in each of the following figures according to what is written below each :



- a. Determination of the angle of reflection of the ray in mirror (Y).



- b. Calculating the angle of emergence from point (X) given that the optical density of air is less than plastic.

- (6) Look at the opposite figure, then answer :

1. The opposite figure indicates the property.
2. The speed of light through air is its speed through water.
3. Why does the pencil seem broken ?



استمتع بمشاهدة شرح الدروس والتجارب و الأنشطة
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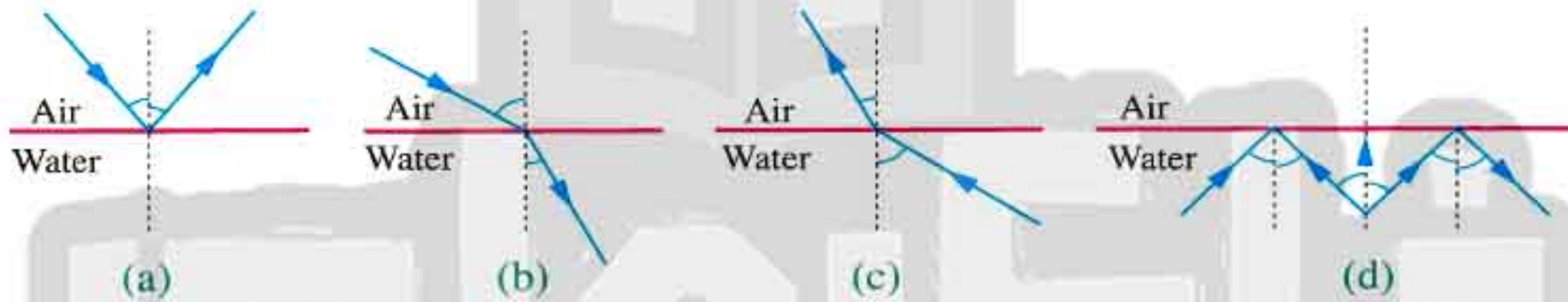
Timss Questions



1. Choose the correct answer :

- A person inside a dark room can see another person from the window. The outside person can't see the person in the room, this is because
 - there is no enough light reflected from the person inside the room.
 - the light rays can't penetrate the window.
 - light doesn't penetrate windows.
 - sunlight isn't intense enough as other light sources.

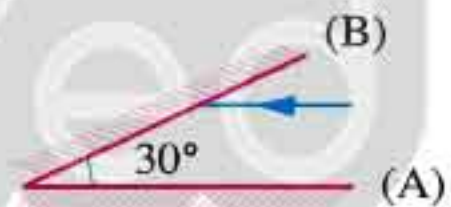
2. Which of the following figures represents light refraction :



2. Books and reference books aren't preferred to be printed on bright papers. Why ?

3. Draw the following figure, then :

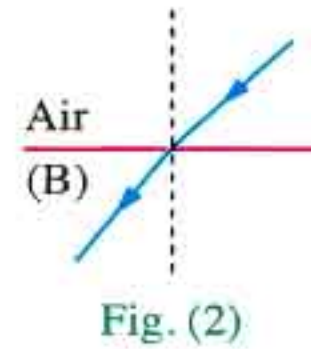
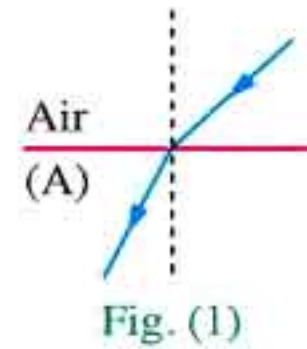
- Complete the pathway of light ray, which is incident parallel to the mirror (A) where it reflects from it.
- Find the angle of reflection from mirror (B).
- Find the angle of incidence on mirror (A).



4. These are values of absolute refractive index of five substances (1.5 - 0.8 - 1.8 - 1 - 1.3) Which of them are wrong ? Why ?

5. From the following figures :

Which of the two medium (A) or (B) has more optical density ? Why ?



UNIT TWO

Lesson

1

Properties of Sound Waves

Worksheet

6

Question

1

Complete the following statements :

1. The human ear can differentiate between the sounds through different factors which are sound, sound and sound
2. Sound is produced due to
3. Sound waves are waves which travel through air as pulses of and
4. The voice of lion is pitch than that of sparrow.
5. The frequency of the vibrating string is proportional to its length.
6. Musical tone is a sound of frequency and it is produced from and

Question

2

1. If the frequency of sound produced from Savart's wheel is 1000 Hertz, when the metallic plate touches the teeth of a certain gear. Find the number of teeth of such gear if the wheel makes 250 rotations in one and a half minute.
.....
.....
2. A tuning fork produces a sound wave of frequency 512 Hz, if its wavelength is 65 cm. , calculate the velocity of sound through air in metre/sec.
.....
.....

Question

3

What is meant by ...?

1. Sound pitch :
2. The wavelength of a sound wave equals 3 cm :
3. Sound velocity :

Question

4

Mention an activity to show that the sound pitch depends on its frequency.

.....
.....
.....

PART

1

Question 5

A Give reasons for :

1. We hear sound from all directions that surround the sound source.

.....

.....

2. The violin's player changes the length of strings during his play.

.....

B You have three gears in Savart's wheel shown in the table. Answer the following :
By rotating them and touching each with a metallic plate.

1. The sharp sound is produced from touching the plate to the gear

The gear no.	A	B	C
No. of teeth	20	40	60

2. Adham has run the wheel to 540 cycles/min. and the half of the frequency equals 180 Hz. Which gear has Adham touched with the plate ?

.....

Worksheet 7

Question 1

Write the scientific term :

- The measuring unit of sound intensity. (.....)
- The intensity of sound at a point varies inversely with the square of the distance between that point and the sound source. (.....)
- The characteristic by which the ear can distinguish between sounds as strong or weak. (.....)
- The measuring unit of noise intensity. (.....)

Question 2

A Choose the correct answer :

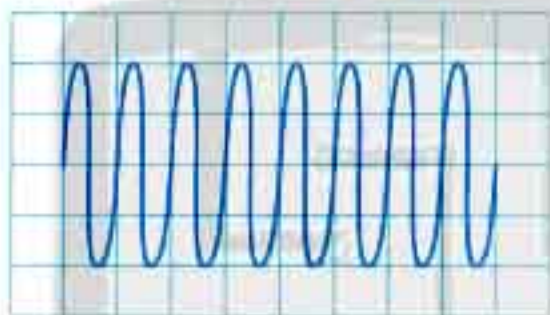
- All of the following are factors affecting sound intensity except the
 a. amplitude of vibration. b. medium density.
 c. frequency. d. wind direction.
- The intensity of sound in the presence of carbon dioxide as a medium for sound travels is that in the presence of air.
 a. equal to b. higher than c. lower than d. half of
- The intensity of sound when the direction of sound waves propagation is in the opposite direction of wind.
 a. decreases b. increases c. doesn't change d. (a) or (b)

B Give reasons for :

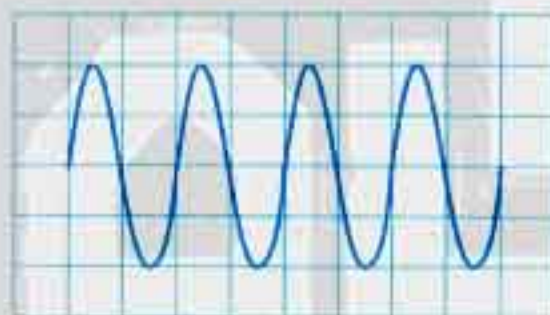
- The intensity of sound increases when the sound source touches a resonance box.
.....
- The intensity of sound decreases as the distance between the ear and sound source increases.
.....
.....

Question 3**Mention the relationship between each of the following :**

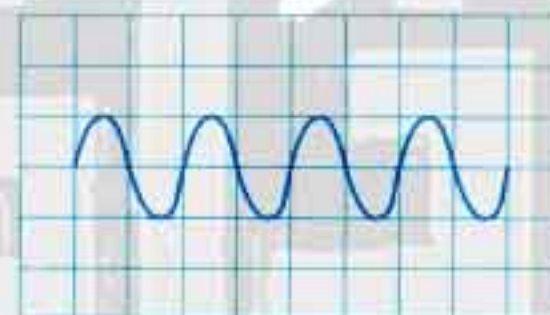
- The sound intensity and the amplitude of vibration of the sound source.
.....
- The intensity of sound and the density of the medium through which the sound passes.
.....

Question 4**Using the following figures, compare from the point of view of sound intensity and pitch between :**

Wave (A)



Wave (B)



Wave (C)

- Sound wave (A) and sound wave (B) :
.....
- Sound wave (B) and sound wave (C) :
.....

Worksheet 8**Question 1****A Put (✓) or (✗) :**

- Ultrasonic waves have frequencies less than 20 Hz. ()
- Sound of frequency 25000 Hz is audible sound. ()
- Bats, dogs and dolphins can hear ultrasonic waves. ()

B What is meant by ...?

- Sonic waves :
- Sound quality :

PART

1

Question

2

You have several resonating sources with different frequencies :

These sources are arranged ascendingly according to their frequencies in the following table :

Resonating source :	1	2	3	4
Its frequency (vibrations/sec.) :	10	50	10000	30000

- You can hear sound waves produced from vibration of source(s)
[(1 , 2) , (2 , 4) , (1 , 4) , (2 , 3)] (Choose one answer)
- The waves used in food sterilization is produced from source(s)
[(1 , 2) , (2 , 3) , (4 only) , (3 , 4)] (Choose one answer)
- Does any of these waves travel through free space ? Why ? (Answer)
.....
- The waves that are produced from the vibration of the vibrating sources are called :
a. Sonic in case of b. Ultrasonic in case of
c. Infrasonic in case of (Complete)

Question

3

Give reasons for :

- The human ears can hear sounds of frequencies ranging from 20 Hz to 20000 Hz.
.....
.....
- Piano's sound differs from violin's sound even if they have the same intensity and pitch.
.....
.....
- The importance of ultrasonic waves.
.....
.....

Question

4

A person stands near an apparatus producing different sounds of different frequencies as follows :

12 Hz , 15 Hz , 35 Hz , 50 Hz , 1000 Hz , 15 000 Hz , 20 000 Hz , 25 000 Hz.

Which of these sounds will be heard by such person ? Why?

.....
.....

UNIT TWO

Lesson

2

Wave Nature of Light

Worksheet

9

Question

1

What is meant by ...?

1. Speed of light :
2. Light :
3. Visible light :

Question

2

A Give reasons for :

1. The energy of red light photon is less than that of orange light photon.
.....
.....
2. Light can travel through free space.
.....
.....

B Mention the uses of light ?
.....
.....

Question

3

Choose the correct answer :

1. Light waves are waves.

a. mechanical transverse	b. electromagnetic transverse
c. electromagnetic longitudinal	d. mechanical longitudinal
2. The quantum of energy of green light is the quantum of energy of yellow light.

a. greater than	b. equal to
c. less than	d. no correct answer
3. All of the following are from the characteristics of the red colour in spectrum colours except

a. it has the lowest frequency.	b. its photon energy is the smallest one.
c. its photon has the highest deviation.	d. it has the longest wavelength.

4. Energy of the photon equals
- Planck's constant + Frequency.
 - Planck's constant \div Frequency.
 - Planck's constant \times Frequency.
 - Planck's constant - Frequency.
5. scientist proved that the energy of light waves is composed of photons.
- Isaac Newton
 - Kepler
 - Al-Hassan Ibn El-Haitham
 - Max Planck

Worksheet 10

Question

1

Compare between : transparent medium and translucent medium :

Points of comparison	Transparent medium	Translucent medium
• Definition :
• Examples :

Question

2

Write the scientific term :

- A medium doesn't allow light rays to penetrate through. (.....)
- The light intensity of a surface is inversely proportional to the square of the distance between the surface and the source of light. (.....)
- The quantity of light falling perpendicular to a unit area of a surface in one second. (.....)

Question

3

Put (✓) or (✗) :

- The light travels in curved lines through transparent medium. ()
- By increasing the thickness of the transparent medium, the quantity of light that passes through it increases. ()
- Carton and human skin are examples of opaque medium. ()

Question 4

Explain an activity to demonstrate that light travels in straight lines through transparent media :

.....

.....

.....

.....

.....

Question 5

Give reasons for :

1. The inability to see the impurities present in black honey.

.....

.....

2. The intensity of light on a surface decreases to its quarter when the distance between the light source and this surface is doubled.

.....

.....

3. The clothes pins can be seen clearly before and after placing them in a transparent plastic bag.

.....

.....

4. Carton is an opaque medium.

.....

.....

Question

1

Complete the following :

1. The energy of the photon is proportional to the of light wave.
2. waves are audible sounds.
3. White light consists of a mixture of seven colours which are known as
4. High pitch sounds have relatively large and small
5. By increasing the speed of rotation in Savart's wheel the frequency ,
the sound becomes

Question

2

- A** Calculate the number of the gear teeth of Savart's wheel, given that the frequency of the sound produced is 100 Hz. and the wheel rotates 30 cycls/min.

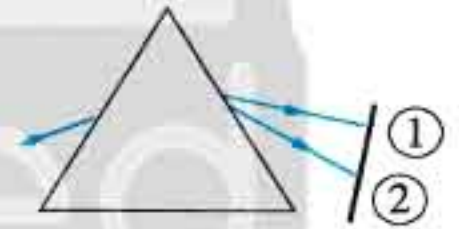
.....

.....

.....

- B** In the opposite figure :

Which ray represents the red colour and which ray represents the violet colour ?



.....

.....

Question

3

- A** Choose the unsuitable word, then express the rest of the words with something proper.

1. Yellow / Blue / White / Violet

.....

2. Violin / Drill / Piano / Reed pipe

.....

- B** Put (✓) or (x), then correct what is wrong :

1. The sound velocity through liquids is less than that through gases.

()

2. Light travels through transparent media in the form of straight lines

()

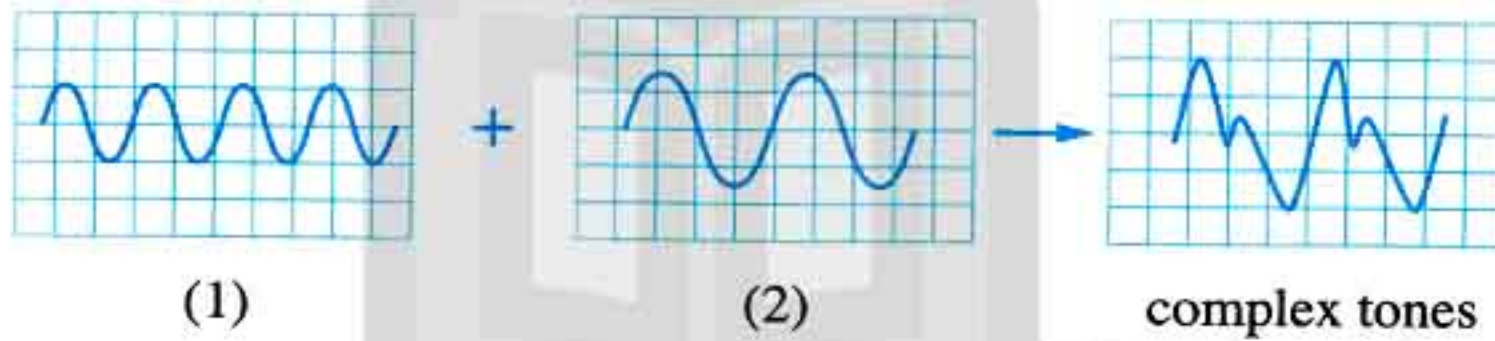
3. Sound wave of frequency 15000 Hz is audible sound.

()

Question 4

The following figures shows the formation of complex tones.

Which of the two figures (1), (2) represents the fundamental tone and which one represents the harmonic tone. (give a reason).



.....

.....

.....

.....

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UNIT TWO

Lesson

3

Reflection and Refraction of Light

Worksheet 12

Question

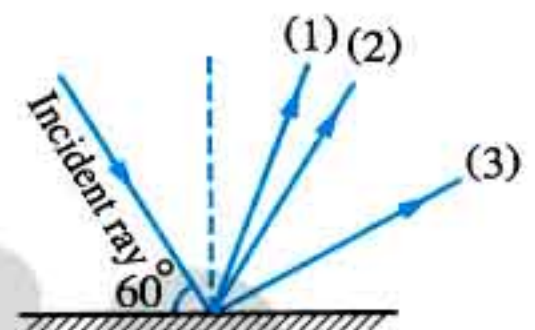
1

A Write the scientific term :

1. A smooth or rough surface at which the reflection of light takes place. (.....)
2. The angle between the incident ray and the line perpendicular to the reflecting surface at the point of incidence. (.....)

B From the opposite figure, answer the following :

1. The reflected ray is number
2. The angle of reflection =



Question

2

A What is meant by ...?

1. Light reflection :
2. Angle of reflection :

B Study the following figures, then answer the questions :

1. Find the value of the angle of incidence and the angle of reflection in each of the following cases :

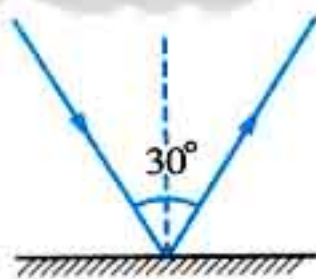


Fig. (1)

.....
.....

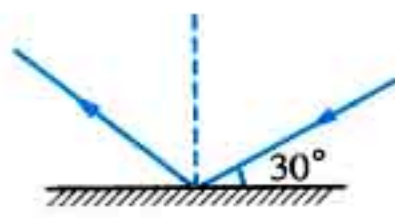


Fig. (2)

.....
.....

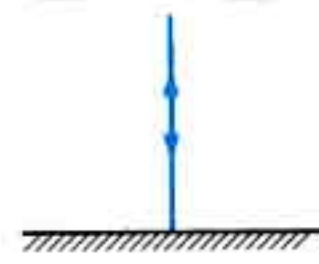
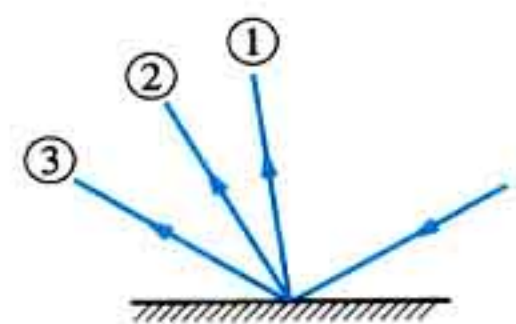


Fig. (3)

.....
.....

2. Which of the following reflected rays represents the reflected ray in the right direction and why ?

.....
.....



Question 3

A State the two laws of light reflection :

- * First law :
- * Second law :
-
-

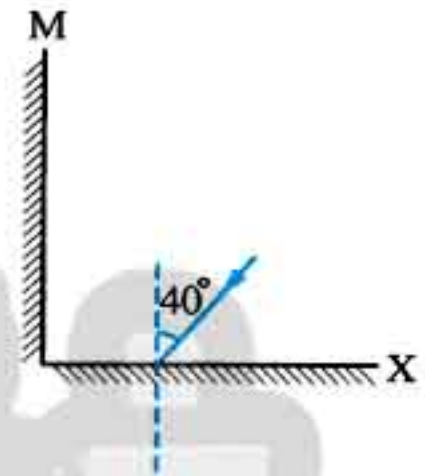
B Choose the correct answer :

1. If the angle between the incident ray and the reflecting surface is 60° , then the angle between the incident and the reflected rays will be

- a. 30° b. 60° c. 15° d. 120°

2. In the opposite figure, when a ray of light falls on the mirror (X) by an angle 40° , the reflected ray will fall on the surface of the mirror (M) by angle of incidence equals

- a. 30° b. 60° c. 40° d. 50°



Question 4

What happens when ... ?

1. A light ray falls perpendicular on a reflecting surface. Why ?

.....

.....

2. Incidence of light rays on a rough surface.

.....

.....

Worksheet 13

Question 1

A Give reasons for :

1. The light refracts when it travels from a transparent medium to another of different optical density.

.....

.....

PART

1

2. The absolute refractive index of any transparent medium is larger than one.

.....

3. A coin in a glass of water appears in a position higher than its true position.

.....

B Complete the following :

1. When a light ray travels from a transparent medium of higher optical density to another of lower optical density, the angle of is more than the angle of

2. Light is the change of light path when it travels from a transparent medium to another one of different

Question 2

A Show by drawing the path of the ray by which the eye can see the body.

B Choose the correct answer :

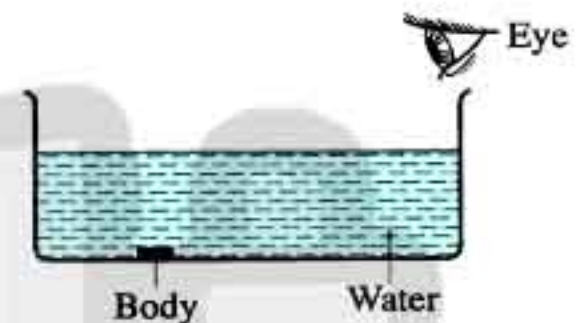
A hunter standing on the shore of the sea, he wants to catch fish under water surface, so he should direct the arrow

a. to the body of the fish.

b. above the body of the fish.

c. below the body of the fish.

d. beside the body of the fish.



Question 3

What happens when ...?

1. A light ray falls perpendicular to the interface between two transparent media of different optical densities.

.....

2. You look at a pencil partially immersed in a cup of water. Why ?

.....

Question 4

A Write the scientific term :

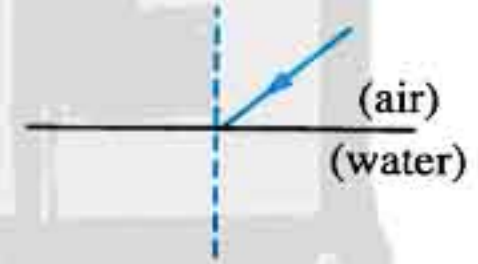
1. A natural phenomenon that takes place on desert roads at noon in summer times. (.....)
2. The ability of the transparent medium to refract the light. (.....)
3. The angle between the emergent light ray and the normal at the point of emergence on the interface. (.....)

B What is meant by ...?

1. The refractive index of water is 1.3
.....
.....
2. The angle of refraction.
.....
.....

C Complete the opposite figure, then answer the following :

1. The light ray refracts the normal.
2. The angle of is greater than the angle of



Rania Sayed

General Exercise of the School Book

on Unit TWO

1 Write the scientific term :

1. Sound waves of frequencies less than 20 Hz. (.....)
2. A medium does not allow light rays to penetrate through. (.....)
3. Changing the path of light when travel from a transparent medium to another transparent medium of different optical density. (.....)
4. The incident light ray, reflected light ray and the normal at the point of incidence on the reflecting surface all lie in one plane perpendicular to the reflecting surface. (.....)

2 Choose the correct answer, with the scientific explanation :

1. Sound of frequency 200 Hz is than sound of frequency 100 Hz.
a. sharper b. stronger c. harsher d. weaker
2. When the distance between the source of light and the surface as a wall decreases, the light intensity on the surface
a. decrease. b. increases. c. doubled. d. remains constant.

3 Write down the mathematical relation that joins between each of the following :

1. The photon frequency and its energy.
.....
2. The sound frequency (f), the number of teeth of the gear in Savart's wheel (n).
.....

4 What are the results due to each of the following ?

1. Incidence of light rays on a rough surface.
.....
.....
2. Incidence of a white light ray on one face of a triangular glass prism.
.....
.....

5 What is the scientific basis on which the following depends ?

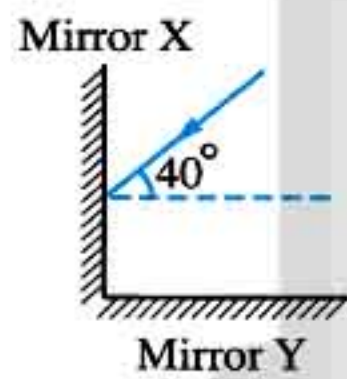
The strings of a musical lute are fixed on a hollow wooden box.

.....

.....

6 Complete the path of rays in each of the following figures according to what is written below each :

A

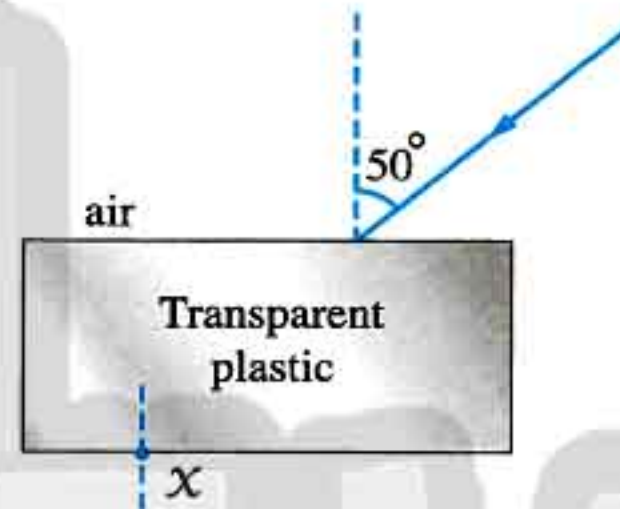


Determination of the angle of reflection of the ray on mirror (Y)

.....

.....

B



Calculating the angle of emergence from point (X) given that the optical density of air is less

.....

.....

Rania Sayed

Model Exams

on Unit TWO

Model Exam

1

20

Answer the following questions :

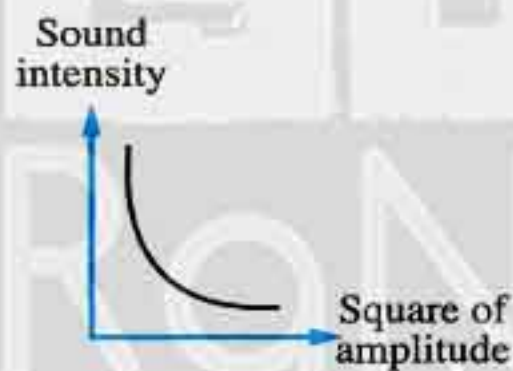
Question

1

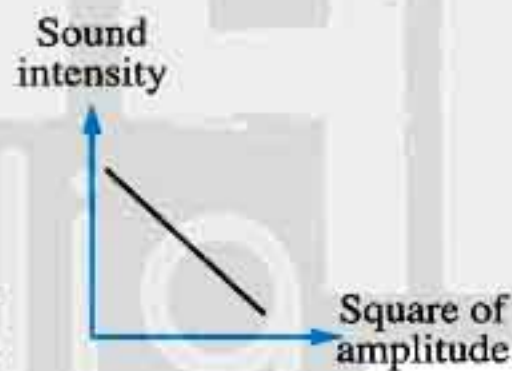
5 marks

A Choose the correct answer :

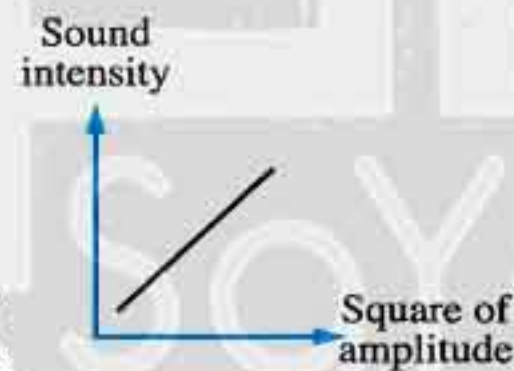
- The substance that a sound wave travel through is called the
a. medium. b. vacuum. c. rarefaction. d. mediary.
- The angle of incidence of light is its angle of reflection.
a. larger than b. smaller than c. equal to d. no correct answer
- The human skin is considered as a/an medium.
a. transparent b. semi transparent c. opaque d. no correct answer
- The figure represents the relation between the intensity of sound and the square of amplitude of vibration of a vibrating body.



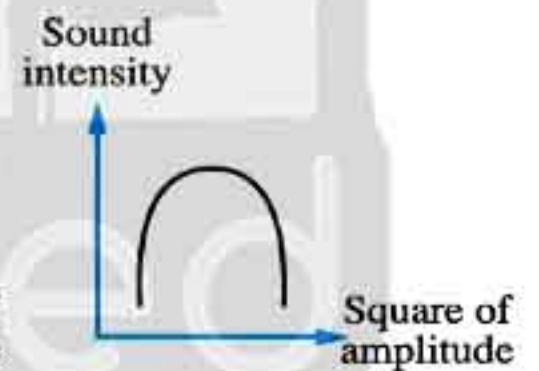
a.



b.



c.



d.

- When a light ray travels from air to water, it
a. refracts near the normal. b. refracts far from the normal.
c. passes with out refraction. d. reflects.

B Give reasons for :

- The pencil which is partially immersed in water, appears as being broken.

.....

.....

- The difference in frequency between the musical tone and noise.

.....

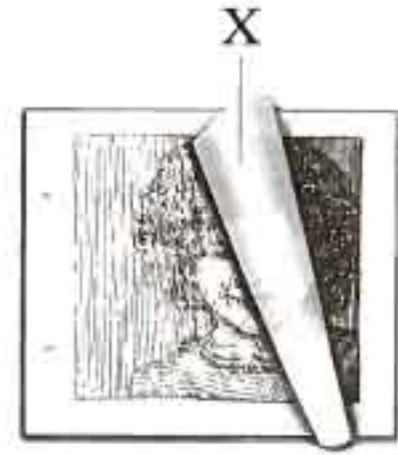
.....

Question 2 5 marks**A** Write down the scientific term :

1. A tone of regular frequency that is produced from reed pipe. (.....)
2. The ability of the medium to refract light rays. (.....)
3. Seven colours are produced as a result of splitting of the white light. (.....)

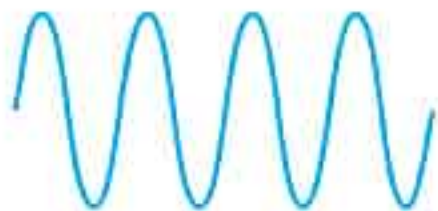
B From the opposite figure :

1. What is the type of slide that placed over the image ?
.....
2. Explain why, we can't see the part present below (X) clearly ?
.....

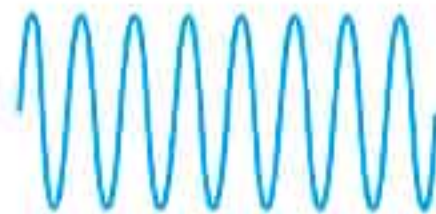
**Question 3** 5 marks

What is meant by ...?

1. The angle of reflection of light ray = 30°
.....
2. Visible light.
.....
3. Sound quality.
.....
4. The velocity of light is 3×10^8 m/sec.
.....
5. Inverse square law in sound.
.....

Question 4 5 marks**A** Compare between the two waves (A) , (B) in terms of pitch : Give a reason.

Wave (B)



Wave (A)

The sound pitch of wave is higher than the sound pitch of wave

That because :

PART

1

- B Explain with drawing an activity to conclude the two laws of light reflection.

.....

.....

.....

Model Exam

2

20

Answer the following questions :

Question 1 5 marks

- A Complete the following statements:

1. The light reflection is classified into two types which are and
2. Sounds of different musical instruments can differentiated from each other by
3. When you look at a coin in a glass of water, its position appears to be lower than the position
4. The light intensity is the amount of light
5. Some animals such as , and can hear ultrasonic waves.

- B Mention the factors affecting the sound intensity.

.....

.....

.....

Question 2 5 marks

- A Define :

1. The reflected ray.

.....

.....

2. Transparent medium.

.....

.....

3. Sound velocity.

.....

.....

Worksheets

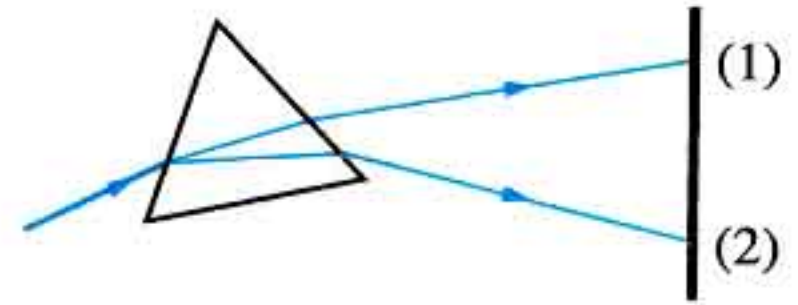
B In the opposite figure :

1. Which ray represents the red colour and which ray represents the violet colour ?

.....

2. Which one has a greater energy, the photon of red light or the photon of violet light ?

.....

**Question****3**

5 marks

A Compare between regular reflection and irregular reflection.

.....

B What happens when ...?

1. The number of rotations per second of Savart's wheel increases.

.....

2. A light ray travels from air to glass.

.....

3. The distance between the sound source and the ears increases twice.

.....

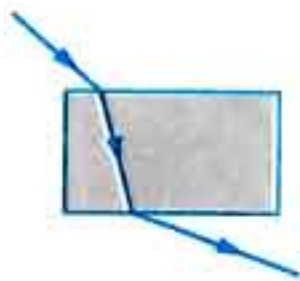
Question**4**

5 marks

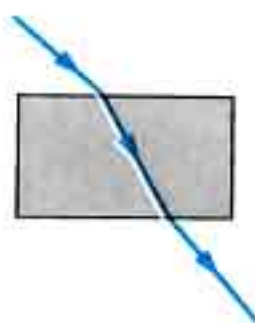
A Calculate the absolute refractive index of water, knowing that the velocity of light through water is 2.25×10^8 m/s. and the velocity of light through air is 3×10^8 m/s.

.....

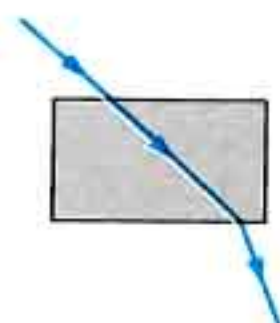
B Choose from the following figures the one that expresses correctly the refraction of light in a rectangular glass block and mention the reason.



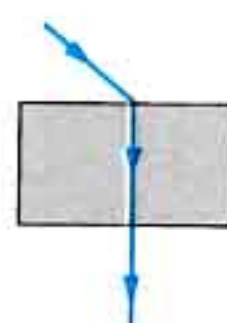
(A)



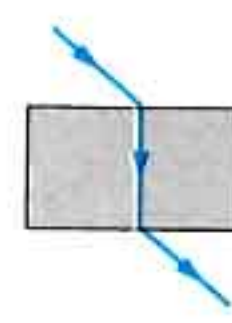
(B)



(C)



(D)



(E)